

The Iron Age

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A Review of the Hardware, Iron and Metal Trades.

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The Radcliffe Steel-Melting Furnace.

Since the first introduction of the Siemens regenerative gas furnaces, attempts have been constantly made to attain the same results by simpler and less expensive methods. These experiments, though sometimes fairly successful for a low degree of heat, have failed at the higher temperature required for heating and melting iron and steel—mainly for want of sufficient regeneration of the air, and also from lack of heat in the

in this country is H. A. Gadsden, 15 Whitehall street, New York. Referring to the illustrations, it will be seen that this furnace is built entirely above the level of the floor, the bath and regenerator being supported upon wrought-iron girders, resting upon cast-iron columns carried down to the ground level, though the regenerator may be placed beneath the bed and directly upon the ground if desired. The furnace is composed of a gas producer, bath, regenerating chamber and air-heating apparatus.

in one direction only, complicated and troublesome arrangements for reversing have been avoided; 4, greater economy in the consumption of coals, as will be seen when we refer to the tabulated results later on; 5, control of the character of the flames, as more or less gas or air in proportion can be delivered at the ports in the combustion chamber, and a non oxidizing flame be uniformly secured. The mode of working is as follows: The fuel is fed from the coal platform into the hopper, and when

from the gas producers. The waste gas, after having done duty in the bath, passes through the flue into the regenerating chamber, and in its passage gives out a portion of its heat for the purpose of heating the air that passes through the regenerator tubes. It then goes through the flues *e e* and *C*, partly between and around the gas producers, as shown by dotted lines, to the air-heating chamber *E*, where it heats the air passing through the wrought-iron tubes to the gas producers by the pipes *m*. The whole fur-

temperature in the gas producers is too high for the heavy hydrocarbons to be produced, they being functions of low-temperature gas producers accompanied with slow distillation. From the producers now in general use the gas is generated at a low temperature, because the air supply is sent cold into the fuel.

An old furnace was altered in the Royal Gun Factories about 20 months ago, with a view to practically proving this principle. This furnace is of six tons capacity, and

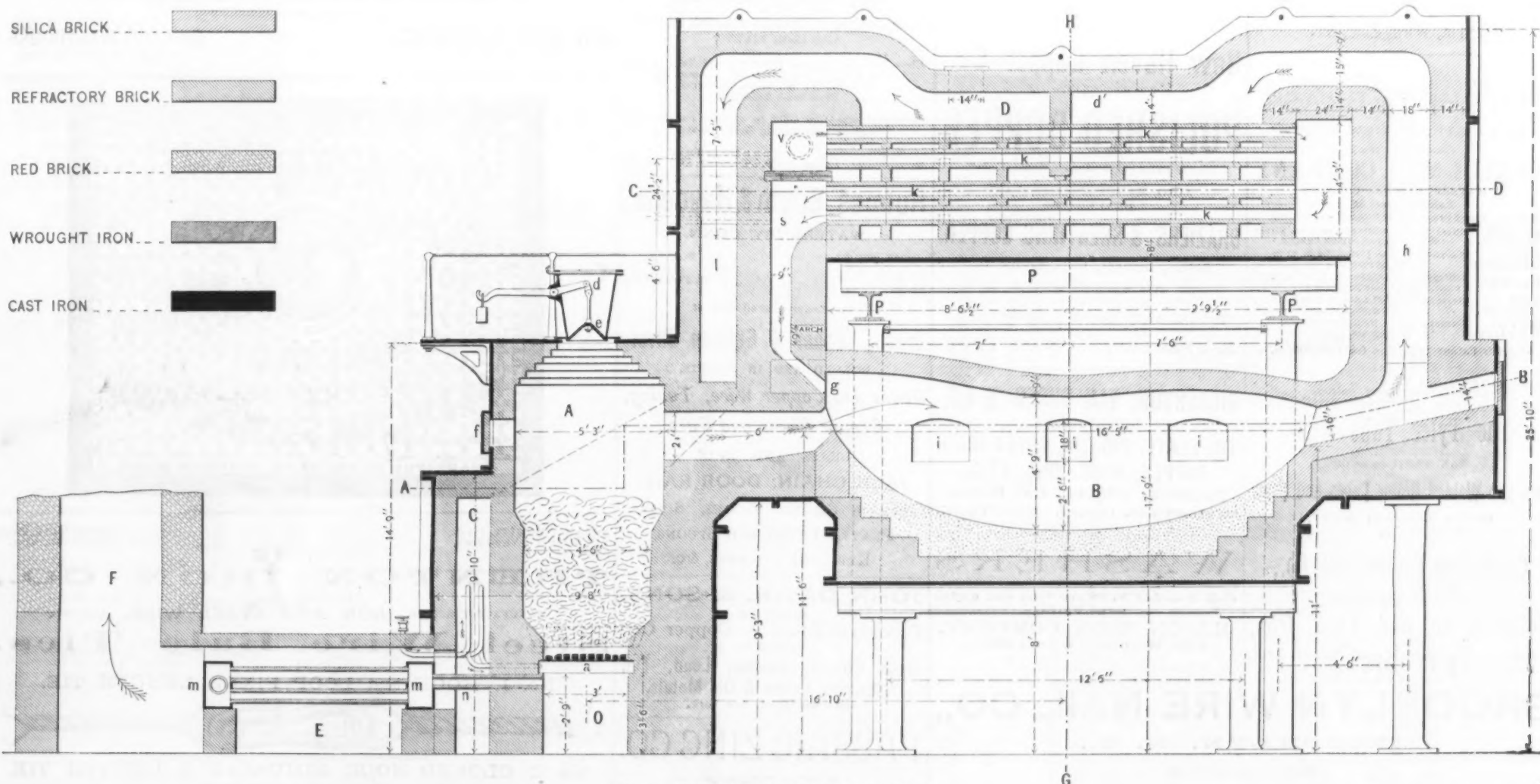


Fig. 1.—Vertical Section through E F, Fig. 2.

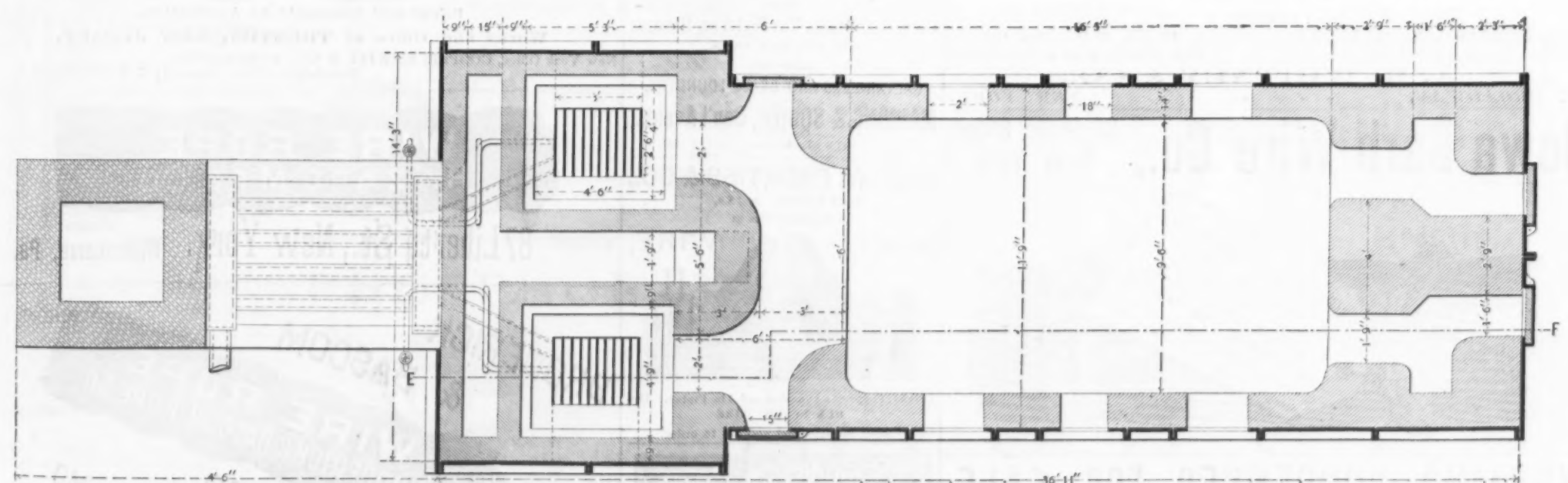


Fig. 2.—Horizontal Section through A B, Fig. 1.

THE RADCLIFFE STEEL-MELTING FURNACE, WOOLWICH ARSENAL.

gases supplied to produce proper combustion. In certain cases where these conditions have been fairly well fulfilled and high degrees of heat attained, the air regenerators have been so complex in construction and so liable to get out of order that the problem has been practically abandoned or at best only partially solved. Until recently, outside of the regular Siemens-Martin forms, few efficient gas furnaces for open-hearth steel melting have been developed. Within the last 20 months, however, a new form of furnace has been designed and put into successful operation at the Royal Arsenal, Woolwich, near London, the invention of Mr. F. Radcliffe, superintendent of the forge department, whose representative

The accompanying Figs. 1, 2 and 3, represent a furnace constructed upon this principle, for the manufacture of open-hearth steel. Fig. 1 is a vertical section through the combustion chamber, regenerator and gas producers; Fig. 2 is a horizontal section through the line A B of Fig. 1, looking down on the combustion chamber; Fig. 3 is a cross section through regenerator and bath. The leading advantages claimed of this furnace are: 1, Simplicity of construction; there being no portion underground, and every part being easily got at for repairs; 2, economy of space; the gas producers being a portion of the furnace, no independent and expensive gas plant is required; 3, the current being continuous

the lever is raised the fuel passes through the valve *d e* into the gas producer *A*. The air for the combustion of the fuel in the gas producer is delivered from a blower under pressure, and enters the air-heating chamber *m m*. The pipe is fixed at one end to the second junction box and conducts the heated air from the heating apparatus to the ash pits *O* of the gas producers. The heated air is then forced into the gas producer from below, the gases passing on to meet the air for its combustion from the regenerator. The latter enters the regenerator at the point *v*, and is under a pressure. It then passes through regenerator tubes, *k*, in the direction shown by the arrows, and passes through the flue *g* to meet the gas

nace, including the gas producers, regenerator and combustion chamber, is combined in one structure, and incased in plates bolted together at the flanges, and is strengthened further by strong tie-bolts passing through from one side to the other. It is found preferable to use a forced air supply for the gas producers, 3 inches of water being sufficient, and for the regenerator a pressure of 2 inches is ample. Before the air supply is allowed to pass into the gas producers it is heated to a temperature of between 700° and 900°. The gas produced under such conditions is of such a high temperature that it needs no regeneration, and is passed immediately into the combustion or melting chamber. The

yielded the following results, the average consumption of fuel being 8.5 cwt. per ton of ingots produced. On January 9, 1886, after a repair, the furnace was lit up, and from results taken until the 31st of March, making 124 charges, the

	T. C. Q.
Total weight of metals charged	822 10 0
Yield of ingots	796 12 3
Loss as skulls and other scrap, 4.3 per cent.	
Fuel consumed, including 11 tons used in heating the furnace preparatory to the first charge	839 6 0

On January 1, 1886, a smaller furnace of 3 tons capacity was started in the shell department for making steel for percussion

(Concluded on page 19.)

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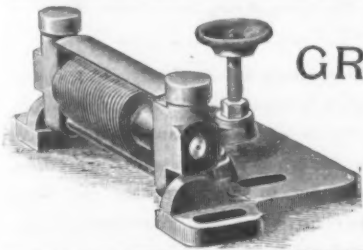
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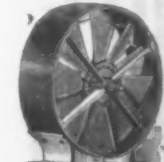


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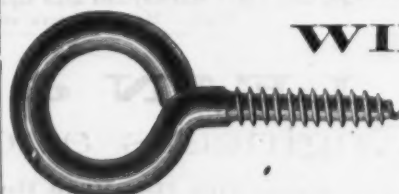
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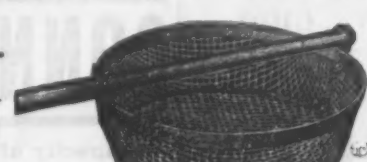
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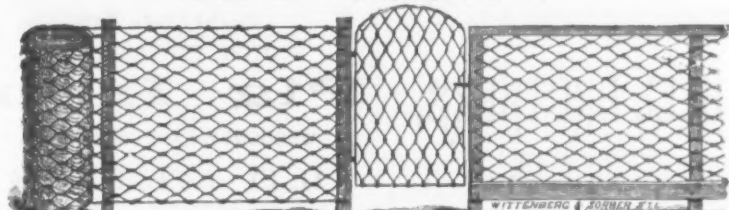


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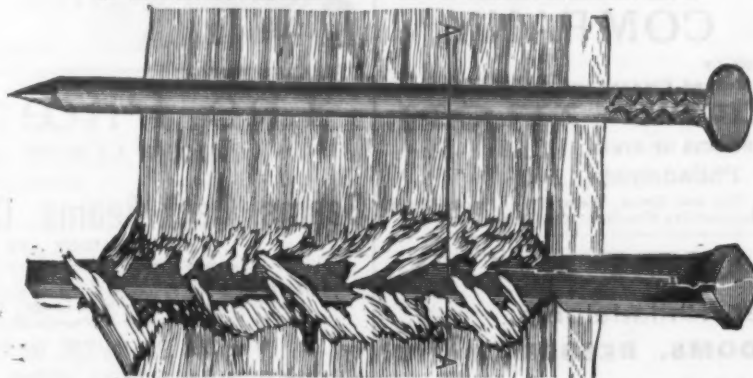
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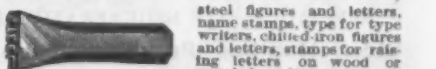
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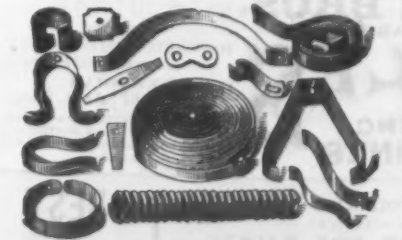


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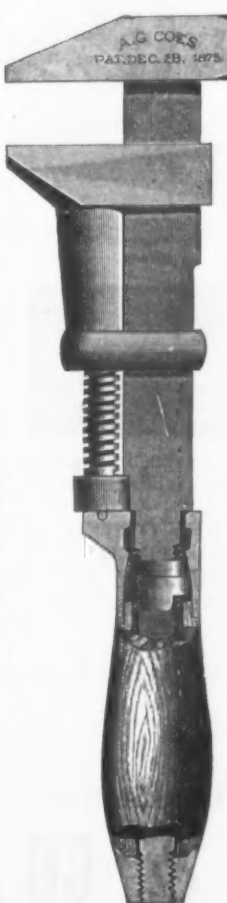
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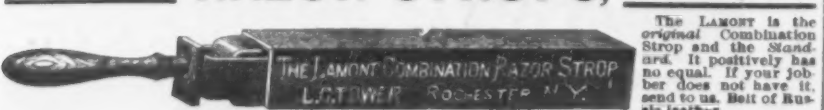
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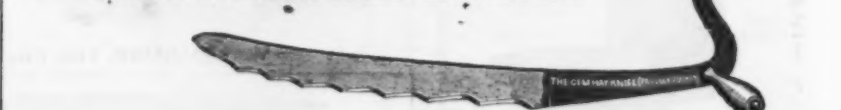


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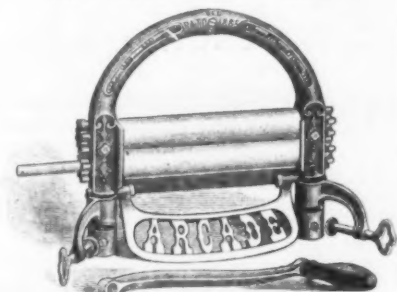
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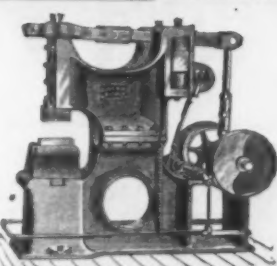
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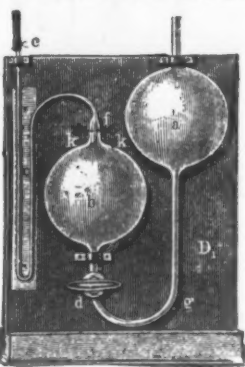
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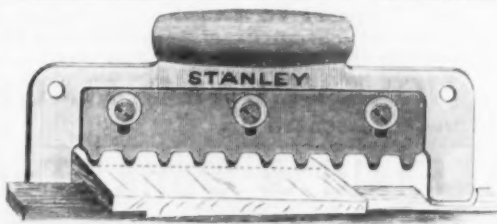
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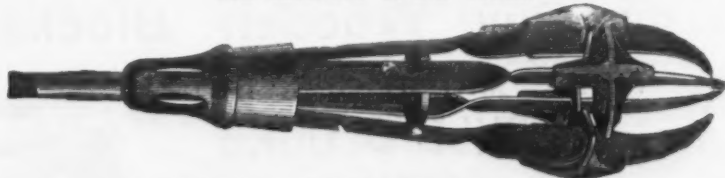
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The sharp edges of the teeth are just parallel with the legs when
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BIRMINGHAM, CONN.

NEW PUBLICATIONS.THE LEAD AND ZINC ORE OF SOUTHWESTERN MIS-
SOURI MINES.

Although possessing a long-established
mining industry of magnitude, very little is
known generally concerning the deposits
and the output of southwest Missouri. The
literature on the subject is very scant in-
deed, and statistical data have been almost
impossible to obtain, largely because the
mining operations in that section are in the
hands of numerous small adventurers. It
is, therefore, especially welcome to have at
least a part of this deficiency covered by a
pamphlet prepared by John N. Wilson, of
Carthage, Mo., which we understand is the
outgrowth of an awakening of local enter-
prise. The pamphlet in question contains an
historical introduction, followed by a geo-
graphical sketch from the pen of Mr. F. L.
Clerc, who is probably one of the best-in-
formed local engineers. Mr. Thomas N.
Davey describes the mining machinery, in-
cluding crushers, concentrating works and
pumping plant, in which as a general thing
southwest Missouri is still deficient. Then
are given the output, with their value, of a
number of mines in Jasper, Newton and
Lawrence Counties, Missouri, and Cherokee
County, Kansas. The total aggregate value
of the ore sold by these counties is \$2,258,-
497, of which Joplin and vicinity claim
\$610,000. The total output of Joplin and
vicinity in lead ore was 3300 net tons, and
of zinc ore 13,768 tons. The counties named
above produced together 13,196 tons of lead
ore and 86,403 tons of zinc ore. These fig-
ures cover the period from March 1, 1886,
to March 1, 1887. They constitute the prin-
cipal source of supply for the smelter in-
dustry of the West, which in 1886 amounted
to 21,777 tons for Illinois, 8932 tons for
Kansas, and 5870 tons for Missouri. They fur-
nish a large proportion of the non-argen-
tiferous lead produced in the United States,
the lead ore probably yielding fully 70 per
cent.

The Business Men's Club of Joplin has
published also a map, the coloring of which,
however, is deceptive. A distinction is
made between agricultural and mineral land,
which is hardly fair. A little table accom-
panying this map gives the lead and zinc
ore output of the region at 8417 tons for the
former and 37,245 tons for the latter. We
are informed, however, that these figures
are only part of the production of the entire
region, including Lehigh, Galena and
Granby.

REPORT ON THE MINING INDUSTRIES OF THE UNITED
STATES, Volume 15, Tenth Census. By Raphael
Pumpelly, special agent, Department of the In-
terior, Washington, 1886.

On the 15th of June, 1884, Mr. Raphael
Pumpelly, a very well-known geologist,
transmitted his report on the mining in-
dustries of the United States, exclusive of the
precious metals, for the year 1880, to the
superintendent of the census, who in his
turn filed the work on the 13th of July,
1886. It has now been at last published
nearly seven years after the investigations
of which it is a record were begun. Under
such circumstances it is natural that so far
as the statistical data are concerned the
volume is of little practical interest, even if
there did not exist grave doubts as to the
accuracy and completeness of the figures
which have rendered so much of the census
work valueless. We cannot help believing
that much of the failure which has charac-
terized this and other works from the same
bureau is due to the effort to extend too far
beyond its natural limits. Too much was
undertaken, and that which should have
been completely and quickly done has suf-
fered. So far as we can judge by the con-
tents of the volume before us, Mr. Pumpelly's
work has been so largely turned over to
others that but little of it should be credited
to him personally. He appears to have written
the introduction, an admirable document in
itself, while the rest of the work, so far as
iron ores are concerned, was carried out by
others to whom the collection and compila-
tion of data was delegated. The under-
taking was a very ambitious one, and if it
had been printed six years ago would have
commanded far more interest than it does
now. Practically, the work undertaken
was to ascertain the extent of our resources
of iron ore, coupled with an extensive in-
vestigation into their quality. It was a huge
plan to attempt to study the structural fea-
tures of the ore deposits of the entire United
States, and to combine with them the com-
plete analysis of all the ores of all the large
mines. The plan necessarily had to be
abandoned, and now only a part has been
submitted in the volume before us. It is
equipped in some respects in that ex-
travagant style, which we have long de-
plored in connection with the work of the
Geological Survey, and it is difficult to
escape the conclusion that greater economy
in some direction would have allowed of
more important work in others. The bril-
liancy of the original plan cannot be ob-
scured by the failure to carry it out, but it
would have been far wiser to keep the work
within natural limits and then carry it out
more completely and promptly. What has
been done has lost some of its interest by
delay in publication, and yet every iron-
master in this country will find it a mine of
facts to which he will frequently go when
necessity calls for a study of deposits not
within the immediate range of his own per-
sonal experience. There are many districts
in the United States in which few changes
have taken place during the last seven
years in which modern developments have
not so completely revolutionized the industry
of a particular region. What may have
been an harmonious whole seven years ago
must now necessarily be a very incomplete
and inadequate picture of our resources,
since development has followed lines little
thought of in 1880. Thus the volume con-
tains an interesting geological reconnaissance
into the Vermilion district, which while it
was valuable then has merely an historical
interest to day. Mr. Edward R. Benton has
described the deposits of Maine, New Ham-
shire and Vermont, giving a number of ana-
lyses of some of the ores of the leading
mines. Mr. Bayard T. Putnam, who appears
to have covered the most ground, deals with
the ores of Connecticut, Massachusetts, New
York and New Jersey. His report is accom-

panied by a large number of sketches of the
leading mines in the States named and by
general maps showing the position of the
principal regions. In New Jersey, of course,
the Geological Survey of that State has more
closely followed developments. So far as
the iron ores of Pennsylvania are concerned
the report is a compilation from partly un-
published material of the State Survey and
of the Census Schedules by Mr. Putnam. In
the case of individual deposits, for instance,
the famous Cornwall, we have since then the
able monograph by Mr. D'Inville. Mr.
Bayley Willis, in a chapter devoted to certain
iron ore deposits in Eastern Pennsylvania,
takes up the Cornwall, Wheatfield, Boyers-
town and Warwick mines. The same writer
has published notes on the iron mines of
Ohio, while Mr. E. R. Benton has made a
special study of the hematites and lemnites
of Indiana and deals with the iron ores of
Virginia, concerning which, however, much
that is valuable has been printed in other
publications since then. W. M. Chauvenet
gives an account of the Kentucky ores, while
Mr. Willis has taken up those of North
Carolina and eastern Tennessee, the rest of
Tennessee being treated by Mr. Chauvenet.
Georgia and Alabama were put into the hands
of the same gentlemen, while Missouri is
dealt with by Mr. Chauvenet. Mr. Putnam
has a monograph on the Marquette and Men-
ominee ranges, in Michigan, while Mr. Willis
made a very interesting trip into the upper
Missouri and Vermilion Lake districts of
Minnesota. He started from Akron on the
Northern Pacific road, by the Missouri river
to the Pockegoma iron region and visited
also the Vermilion Lake district. The same
gentleman described the iron ores of Color-
ado, Utah, California, Wyoming Territory,
Oregon and New Mexico.

The analytical work was done by Mr. A.
A. Blair, whose methods are given in a brief
chapter, to which we have already referred
some time since. Then follow pages of
partial analyses of the samples of ore taken
by the census experts and table of a large
series of complete analyses of iron ores, from
a large number of different mines. Al-
together over 1000 analyses, complete and
partial, were made.

On the coals of the United States Mr.
Frederick Prime, Jr., has a general chapter,
while Prof. Edward Orton deals with the
characteristics of Ohio coals. We do not
know whether Mr. Pumpelly's plan was so
extensive so far as coal is concerned as it
was in the case of iron ore; at any rate, the
general descriptions are limited to those
mentioned. The statistical report on the
production of anthracite, bituminous coals
and lignites will probably be put aside as of
little interest at this late date. A far more
valuable piece of work is a report on the
bituminous coals and lignites of the North-
west. We believe that Mr. Pumpelly has
made this the subject of a special study, and
if we are not mistaken, he was at one time
delegated by the Northern Pacific Railroad
to investigate the entire Rocky Mountains
within the range of the railroad. Under
his direction Mr. William M. Davis, Mr.
Wolff, Mr. Putnam, Geo. H. Eldridge and
others examined the geology of the coals of
Montana, Dakota and Washington Territory.
These reports are accompanied by a large
number of analyses, and are, we believe,
the most important documents of the kind
as yet put forward in regard to the value of
the fuel of the Northwest, upon which im-
portant industries in that part of the Rocky
Mountains largely depend. The balance of
the work is taken up by statistical data on
the production of copper, lead and zinc east
of the rooth meridian, and of minor minerals
to which no importance whatever is attached,
and by a directory of the iron ore, coal, cop-
per, lead and zinc mines and works east of
the rooth meridian in the census year. Al-
together, the report is a volume of over 1000
pages, lavishly supplied with plates by Julius
Birn & Co., of Philadelphia, and by a large
number of sketches printed in the text.

At their annual convention, held at
Minneapolis, Minn., last week, the Master
Car Builders' Association elected the fol-
lowing officers for the ensuing year: presi-
dent, William Wood, of the Grand Trunk,
Montreal; vice president, J. W. Cloud, of
the New York, Lake Erie and Western,
Buffalo; E. W. Grieves, of the Baltimore
and Ohio, Baltimore; John S. Lentz, of the
Pennsylvania and New York Canal and
Railroad Company, Packerton, Pa.; treas-
urer, John Kirby, of the Lake Shore and
Michigan Southern, Cleveland; executive
committee, Joseph Wood, of Fort Wayne,
Ind., R. D. Wade of Richmond, and F. A.
Bissell, of Buffalo. The special committee
on prices, for the settlement of prices of
new cars, submitted a report making an
entirely new classification. The price for
box and stock cars 32 feet long and over
was fixed at \$475, and under 32 feet at \$440.
Flat cars over 32 feet were advanced to
\$350; under 32 feet, \$300.

Companies have been organized to pros-
pect for natural gas at Lincoln and Chris-
man, in Illinois. The interest in the
natural gas question is growing in this State
in consequence of the rich discoveries being
made in the adjoining States. The manu-
facturers of Illinois are anxious to obtain
as cheap fuel as their competitors in other
localities, and the prospecting schemes now
on foot, some of which we have previously
mentioned, ought soon to demonstrate
whether nature has favored Illinois as well
as her sister States.

Cast-iron pipe can be tested for unequal
thickness by being rolled slowly over level
skids by a single operator—any pipe which
shows a disposition to get away should be
allowed—in fact, be aided in the tendency.
The best place to do this is in the pipe
factory before the pipe has gone into the
tar bath, and if the importance of this were
realized by the makers it would be done.

Messrs. E. P. Allis and V. B. Merrell, of
Milwaukee, have published a map of the
mineral regions of Gogebic and Ontonagon
counties, Michigan, embracing a part of the
Gogebic range. The map shows the loca-
tion of the property of the gentlemen re-
ferred to, and of the Reliance Land and
Mining Company.



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NEW REVERSIBLE GUARD RAZOR
MADE BY THE J. R. TORREY RAZOR CO., Worcester, Mass.
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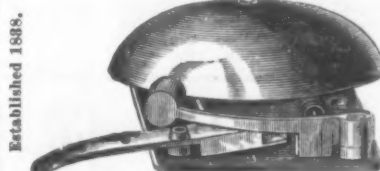
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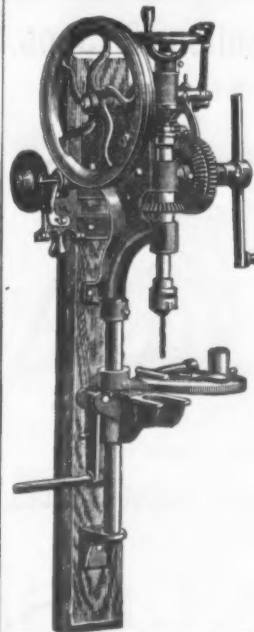
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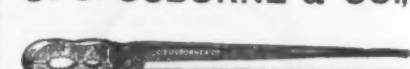


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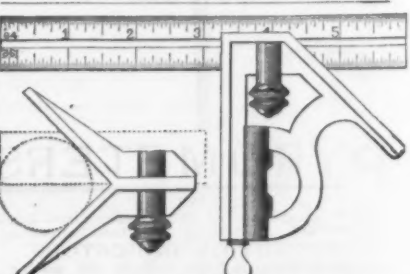
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Acting Force Pump,
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Never Fails. Always Ready.
A Household Necessity. Has
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Our patented Vertical Boiler will not prime. No
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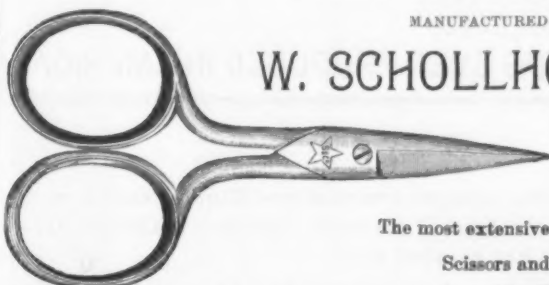
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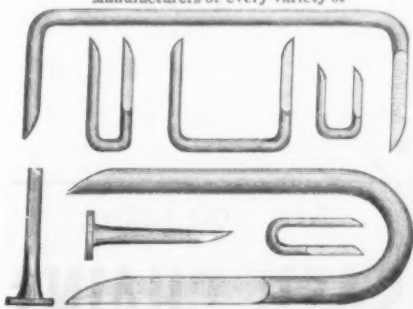
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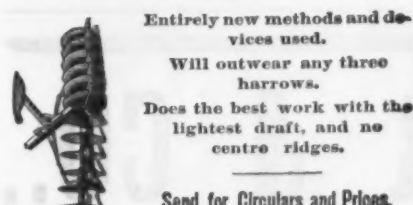


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The Drainage of Fens and Low Lands by Steam Power.

In a second article on the above subject, published in the London Engineer, Mr. W. H. Wheeler writes:

The Archimedean screw-pump has been little used in this country for drainage purposes, but in Holland its use is very general. It is an efficient machine when the level of the water does not vary, but is useless when the head to be pumped against is constantly changing. The advantage of this machine, where it can be used efficiently, consists in its extreme simplicity, having no valves or parts that can get out of order, and it is well adapted for lifting muddy or sandy water. These pumps can be constructed by any intelligent carpenter, and, from their effective working at slow speeds, can be driven by wind-power, or, in the case of the smaller pumps, by hand; or they can be worked by steam. During the drainage of the Zuidplasp Lake, two screw pumps were used to lift the water 22.18 feet at once, being driven by steam engines of 30 horse-power, 30 other screw-pumps driven by windmills being also used.

Bucket pumps have been used in some instances, both in Holland and England, for land drainage, notably for the drainage of Lake Haarlem. Bucket pumps are still in use for the drainage of the Waldersea district on the Nene and of the Marton district on the Trent. The use of these pumps was probably advised by engineers whose experience was acquired in mining districts, where most excellent results were obtained from pumps of the bucket type. Trials of bucket pumps have given out a more useful effect than any others here mentioned, but, as the pumps were designed for working at much higher lifts than those required for land-drainage purposes, these trials do not afford a guide, the proportion of efficiency more rapidly diminishing as the lift decreases than in centrifugals. From the construction of these pumps they are not adapted for a varying lift, and in cases where they have been applied to fen drainage the water has always to be lifted higher than it need be, that at Marton raising the water an average 6 feet higher than necessary. The valves and working parts are also ill-adapted to cope with water charged with mud and grit, and the weeds and pieces of wood which frequently find their way to the inlet.

Centrifugal pumps were first brought into use for the drainage of land in consequence of the successful trials of this machine at the Exhibition of 1851. The proprietor of Whittlesea Mere, a large tract of fen and morass, was so satisfied with the performance of this machine that he gave instructions to Messrs. Easton & Anderson, the exhibitors, for the erection of an Appold pump, calculated to discharge 15,000 gallons—67 tons—a minute to a height of 5 feet. The lift of this pump had to be increased from time to time as the land settled, an operation performed with so little difficulty as to prove the adaptability of the pump for this purpose.

The centrifugal pump is a machine consisting of an outer case with inlet and outlet pipes, in which revolves a fan at a high velocity. The high velocity at which the fans revolve adapts them well for gearing direct to engines running at high speeds. A very large displacement of water is effected in a very short time. The machines are compact and occupy small space. The weight also being about one-twentieth that of a scoop-wheel, the area of buildings required is small, and the cost of foundations is very inexpensive compared to those required for wheels. The first outlay is also considerably less. The average difference of cost of the pumping stations erected in Holland during recent years is £18 per actual horse-power in favor of the pumps.

Another great advantage of the centrifugal pump is that it readily adapts itself to the varying lift which must be encountered in most drainage stations. The facility with which automatically it adjusts the work thrown on the engine as the lift varies is a very great item in favor of this machine. At first starting the engine drain is full and at its highest level. The lift, therefore, being smaller, the pump discharges a larger volume of water; as the water in the drain lowers the lift increases and the quantity pumped diminishes in proportion, giving time for the water to flow from the distant drains down to the engine drain and keep it fed. If pumping into a tidal stream the same effect takes place; as the lift increases the pump adjusts itself to the altered circumstances by sending out a less quantity, gradually regaining its original discharge as the tide falls. With the scoop-wheel the alteration of the level not only affects the quantity of water raised, but also impairs the efficiency of the machine. Further, when permanent settlement of the land occurs, the cost of adapting a pump as compared to a wheel is trifling, all that is necessary being the lengthening of the inlet pipe. Where proper precautions are taken no practical difficulty has been found to arise from weeds and other substances which find their way into the pump well. Pumps have now been running for the last 35 years, and performed their work efficiently and without trouble. At the Lade Bank station a manure fork is shown which, having been accidentally dropped in the feeder on the inner side of the grating, safely passed through the pump, and came out without stopping the machinery or receiving any damage itself. The approach to the pump should always be well protected by gratings placed across the entrance to the raceway. There are two types of centrifugal pumps—the one similar to the Appold pump shown in the 1851 Exhibition having a horizontal spindle, and almost invariably fixed above the level of the water; the other of the turbine form, having a vertical spindle, the fan and case being submerged. All the larger stations in England have been fitted with the turbine form, but in Holland and Italy the pump with horizontal spindle has been more frequently used. Of the three largest makers of drainage pumps in this country, Messrs. Easton & Anderson have adopted the turbine form for all large works, whereas both Messrs. Gwynne & Company and Messrs. J. & H. Gwynne have used the other form.

Scoop Wheels versus Centrifugal Pumps.—The question as to whether the scoop-wheel

or centrifugal pump is the better machine for draining land has been much debated, and the matter is still a subject of controversy. The older class of fen engineers and managers place implicit faith in the scoop-wheel, and believe in it as superior to all other machines. When, however, wheels have been replaced by efficient pumps the result has been so satisfactory that the author has never met with an engineman who would wish to return to his scoop-wheel. Such instances have occurred, and the pump been removed and replaced by a wheel, but only where the pumps were of the most inefficient character and improperly driven. The pump, being a machine of a superior character, needs more intelligence on the part of the person in charge, and with it, as with all other machines, requires care and skill in the driving.

The question as between scoop wheels and pumps was some time ago referred by the Dutch Government to a commission, with instructions to report as to the best machine for raising a given quantity of water—in this case 140 tons a minute—to a height varying between 11.3 feet and 12.3 feet, and also at a height varying from 4.9 feet to 13.1 feet. To the first question the commissioners were not able to give an opinion as to whether one form of pump was superior to all others for a high but nearly constant lift. The answer to the second question was decisively in favor of centrifugal pumps, as they found that no other machine applies so well to differences of level in the external and internal water. No other machine permits the application upon so large a scale of the whole disposable motive force to all lifts comprised within the limits stated; and thus, while the machine adapted for a maximum lift will with lower lifts discharge larger volumes, the useful effect which is produced by the coal consumed does not vary to any great extent. They, therefore, recommend centrifugal pumps for both kinds of work. Subsequently, in 1877, Signor Capparini, an Italian engineer, spent a considerable time in Holland visiting the different pumping stations and investigating this subject. The conclusion he finally arrived at was that no general rule can be given as to the employment of one or other of the different machines, but that all the circumstances of each case must be considered before a decision is come to as to what machine to use.*

The best hydraulic machine for raising water he found theoretically to be the bucket pump, but that these machines are unsuitable for use for lifting flood water conveying a large amount of debris, as they are liable to be damaged and have their valves choked, and experience in Holland has led to the use of centrifugals in their place.

That the general opinion of Dutch authorities was that in choosing a machine, consideration should be given to the following circumstances, and the machine chosen which met these requirements best: The turbidity of the water; the probability of the internal water level being permanently lowered; the nature of the foundations; the method of establishing communication between the inner and outer water level, the level at which the machine can be placed with reference to the water to be discharged, the cost of erecting and working. That the centrifugal had the advantage in all these cases, except the first, over all other machines.

That scoop-wheels are efficient machines, and the best where there is a large amount of debris, and that they have the further advantage that they can be easily repaired by ordinary workmen. The motors for moving them may be of common types, but cannot be used to the best advantage owing to the difficulty of adapting them to the slow velocity required for the wheel. That they further labor under the disadvantage, as compared to centrifugals, of requiring superior foundations. With a high lift the wheel must have a large diameter, the sill must have a low level, and this necessitates massive and deep masonry. That when there is a liability of a permanent lowering of the low-water level, wheels, would require costly alteration, whereas with centrifugals additional lengths can always be added to the piping, and the only difference is that the consumption of steam would be greater. That in regard to the separation between internal and external water the easiest and safest arrangement is that of pumps which discharge the water through pipes carried over the banks or inserted in masonry walls of sufficient thickness, thus avoiding the sluices which are required for wheels or screws. That the system of direct action between engine and pump is one that is most economical in fuel, and that the centrifugal pump lends itself most readily for action with this kind of motor. As regards expense, Signor Capparini gives a table showing the cost of the pumping stations in Holland during the previous 10 years, from which it appears that the average cost per horse-power of water lifted is as follows:

	Building.	Machinery.	Total.
Scoop wheels.....	£46.1	£46.3	£92.4
Screw pumps.....	34.4	36.8	71.2
Centrifugal pumps.....	34.4	36.8	71.2
Piston pumps.....	34.4	36.8	71.2

Statistics given of the drainage stations erected in the seven years 1875-81 show that centrifugal pumps are steadily making their way in Holland, as out of 139 machines put up 50 were centrifugal machines, 33 were scoop-wheels, 30 screw pumps, 4 piston pumps and the others of various types. The forms of centrifugal pumps generally used in Holland are direct acting, having horizontal spindles, the disks placed above the water level. The turbine form has been tried, but the results were not favorable. This type was adopted for the North Sea Canal works; the consumption of fuel for these amounted to 11 pounds per horse-power of work done. The circumstances under which they were worked were, however, not favorable, the pumps being overworked and the lift less than that for which the pumps were designed.

With reference to this, it should be remarked that neither with pumps nor scoop-wheels is the consumption of coal proportional to the lift or the work done, the relative quantity increasing as the lift decreases. This is what would naturally be expected, as the dead weight of the machinery bears

* Capparini on Water Raising Machinery. "Proceedings Inst. C. E., Vol. Lxxv. 1883-84."

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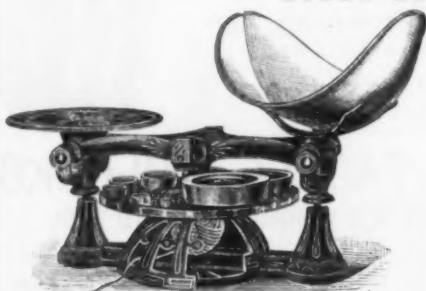
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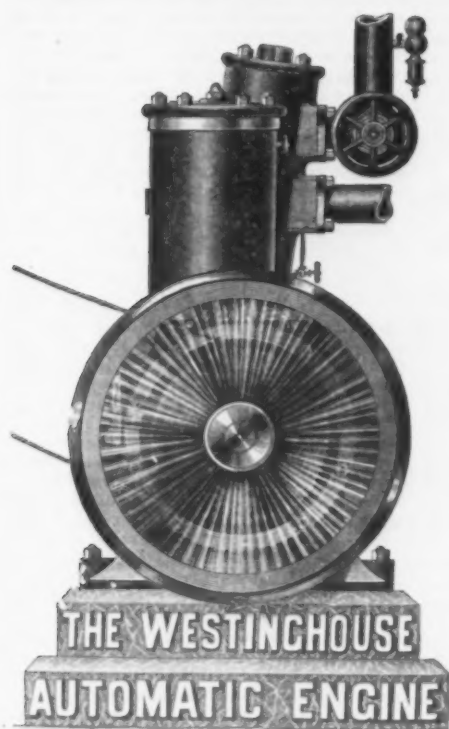
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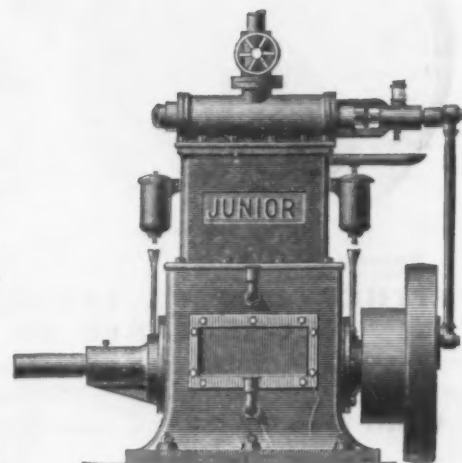
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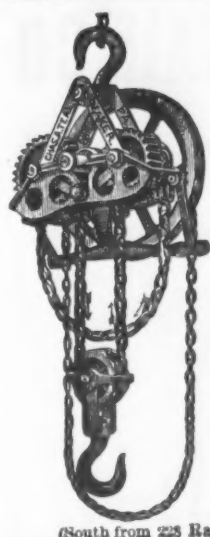
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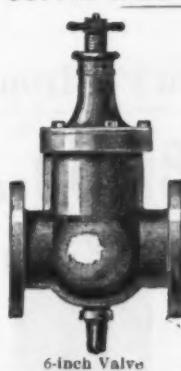
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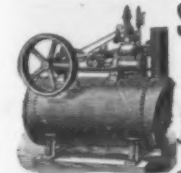
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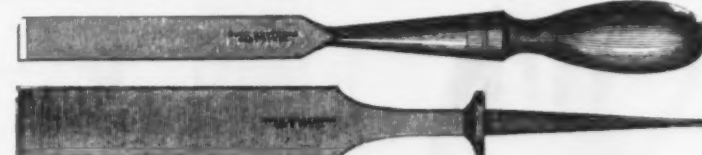
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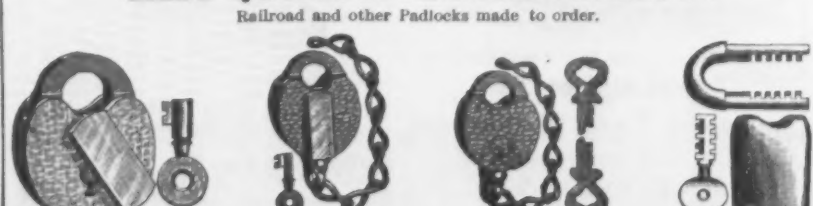


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pounds per horse power per hour, the differ-
ence being accounted for by the large
amount of power required simply to drive
the wheels. In recent contracts made for
centrifugal pumps in Holland this matter
has been taken into consideration, and three
conditions of lift are specified. Mr. Barker,
one of the commissioners, gives the con-
sumption of coal for engines working centrifu-
gal pumps, as varying with the lift, as
follows—not counting coal for getting up
steam:

Feet of lift.....1 2.40 3.30 7.20
Pounds of coal per horse- 5.30
power of water lifted.....9.37 8.82 7.71 6.00
[Transactions, Institution Civil Engineers,
Vol. lxxv., p. 274.]

With regard to the relative merits of scoop
wheels and centrifugal pumps in the quan-
tity of coals consumed, the general weight
of opinion among engineers in this country,
who have had an opportunity of comparing
the relative merits of the two machines, is
decidedly in favor of the centrifugal pump.
This question was thoroughly investigated
about 10 years ago by Mr. J. M. Heathcote,
of Connington Castle, a gentleman who was
not only the owner of land drained by steam
power, but was greatly interested in fen
drainage. As the result of his investiga-
tions, Mr. Heathcote came to the conclusion
that the pump was decidedly the more econ-
omical machine, and in this he was sup-
ported by facts and figures from other
sources furnished by Messrs. Easton &
Anderson. These, however, while useful
so far as they went, were not drawn
from actual trials of the two machines
working under precisely similar cir-
cumstances. The nearest approach to
this is the running of the two sets of ma-
chines over a series of years for the drainage
of the Wexford Harbor reclamation. For
the three years—1881, 1882, 1883—the con-
sumption of coals at these two pumping
stations was about one-third in favor of the
centrifugal pumps, or at the rate of 18.65
pence per acre for the land drained by pump,
and 26.30 pence for that drained by scoop-
wheels. The latter were of modern con-
struction, and the lift in each case the same.
Having paid considerable attention to this
subject, and had frequent opportunities of
becoming acquainted with the working of
both machines, the conclusion arrived at by
the author is that, with regard to existing
wheels, where a scoop-wheel can be made
efficient at a reasonable outlay, it would be
more economical to adopt it than to replace
it by a centrifugal pump. If the wheel re-
quires replacing, or great expense has to be
incurred in altering the masonry and founda-
tions and lowering the wheel, it will be found
most economical to replace it with a centri-
fugal pump. In all new drainage districts
in this country, there can be no doubt that
the pump is the most efficient and econom-
ical machine to fix.

The Cahaba Coal Mining Company.

For some time past it has been the sub-
ject of much comment that even now the
furnaces running in the South are being
frequently troubled with scarcity of coke.
It is inferred from this that, when one by
one the many stacks now in course of con-
struction attempt to blow in, the coke
scarcity will be intensified. It may be
stated, however, that some of those now
building furnaces have made ample provision
for their coke supply, among them the
parties who are building at Anniston, Ala.,
who have made important developments in
the Cahaba field, likely to prove of great
interest to the Southern Iron industry
generally. The Cahaba Coal Mining Com-
pany was organized by the T. H. Aldrich
Company, A. L. Tyler and Samuel Noble,
of Anniston, Ala., and W. S. Gurnee of New
York.

The Cahaba property embraces over
30,000 acres of coal lands, and where now
opened the vein is 6 feet thick without a
particle of slate, and is very low in sulphur.
The company have built a railroad from
Woodstock on the Alabama and Great South-
ern Railroad to the mines at Blockton, at a
cost of \$250,000. The Louisville and Nash-
ville Railroad are also constructing a branch
to connect their road with the mine, while
the Eastern Tennessee, Virginia and Georgia
Railroad are putting a road under contract
to run from a point near Montealeo, con-
necting with the Cahaba Company's road at
Blockton. Thus the property of the com-
pany is opened on both sides, and is con-
nected with the Eastern Tennessee, Louis-
ville and Nashville, and Alabama and Great
Southern Railroads. The present output is
700 tons per day from one slope. A second
slope and a new shaft have been commenced
and progressed some distance in, so that in
less than six months it is estimated that the
output will be increased to 2500 tons a day.
Contracts have been closed for putting up
300 coke ovens, and the Blockton road is
being extended to the new slope and shaft.
As soon as the Eastern Tennessee reaches
the Cahaba property on the east side, new
slopes will be put down on that bank of the
river. The following analyses of coke were
made from coke produced from a car of
coal shipped from a side track and sent to
the Woodward coke ovens where they were
coked 50 hours. About half a ton of it was
sent to Anniston, and a gentleman who
examined the coke took samples of it and
had it analyzed with the following results:

Volatile hydro-carbons..... No. 1. No. 2.
Fixed carbon..... 4.508 4.224
Sulphur..... 87.697 86.923
Ash..... 0.745 0.678
ash..... 7.140 8.080

Mr. Samuel Noble informs us that these
analyses were a surprise to them, since
while they knew that the coke was ex-
cellent, hard and silvery and would carry
a good burden, they had no idea it would
go so high in carbon and so low in ash.
The following is the analyses of the lime-

stone at Anniston made by Spears &
Howard.

Carbonate of lime..... 99.81
Magnesia..... 0.17
Silica..... 0.31
Organic matter..... 0.38

It is believed that with such coke, good
ores and limestone of the quality given,
excellent iron can be made at Anniston in
the near future.

Foreign Markets.

FRANCE

PARIS, June 11, 1887.—Metals.—Transactions
have increased in volume, at well-sustained fig-
ures, with an advance in Lead. We quote at the
close: Copper.—Cath Bars, 103.75 @ 107 francs 1/2
100 kg.; Ingots and Slabs, 110; Best Selected,
112.50; and Pure Corrocor Ore, 106.50. Tin.—
Banco, 292.50 @ 295; Straits, 276.35; Billiton, 282.50,
and English, 275.75. Lead, 31 @ 41 1/2; and Spelter,
38 @ 38.50. Iron.—Competition among dealers
keeps prices low in this city. Merchant selling at
13.50 and Beams at 12.50, below parity with the
North. Old Rails sell below at 7 francs. At
Charleville, in the Ardennes, only the foundries
seem to be doing well. In the Haute-Marne but
three rolling mills are busy to their full capacity;
prices, nevertheless, are sustained at 14 @ 14.50
francs Coke Merchant No. 1. Since works in the
North and Champagne consume two e Blooms and
Steel Billets they use less Pig Iron, so that blast-
furnaces of the Northwest have had to look for
an outlet elsewhere, and in this they seem to suc-
ceed, hence the stock of Pig is fast being reduced in
the Meurthe and Moselle. Works in Central
France are kept busy by army and navy orders,
less so by orders for railroad material.—*Moniteur
des Interets Materiels.*

BELGIUM

BRUSSELS, June 11, 1887.—Iron.—Although to
some degree unsettled by the strikes interfering
with the Coal supply, the Iron trade rests on a
sound foundation with us at present to lose
much of its strength. Orders continue to arrive
steadily, and are being executed without much
difficulty, at steady rates. Orders for Structural
Iron abound, and for Beams they far exceed the
capacity of turning them out. There is a good
demand for Sheets likewise. The situation is
better in the Liege basin than in the Charleroi
region, for the simple reason that on the banks of
the Meuse and Sambre there are more rolling
mills owning their own blast furnaces. Forge Pig
remains firm at 1.20 francs @ 100 kg., and Foundry
ditto at 4.70. No. 3, Sheets, 13 @ 21 francs—the
latter for No. 4; Steel Sheets, 15.50.—*Moniteur
Industriel.*

GERMANY

HAMBURG, June 11, 1887.—Iron.—Our Dortmund
correspondent reports a dragging state of affairs
in Rhinish-Westphalia, with generally rather
weaker prices. Consumers of Pig Iron still hesi-
tate about contracting for another quarter, think-
ing that in a week or two they may do better.
Still in the Rhinish-Westphalian district Pig Iron
has been better sustained than in the Siegen dis-
trict, where Forge Pig, Spiegeleisen and Bessemer
have given way, the tendency being downward, so as
regards Foundry Pig. Rolling mills are still busily
engaged in filling former orders, which may last
during the remainder of the month. Meanwhile
fresh commands are scarce, and iron works are
unable to meet moderate current requirements. Beams
form an exception, and continue largely wanted,
owing to the activity noticeable in building in
Germany. Merchant is kept steady only by the
syndicate agreement and the reduction of stock
in dealers' hands. While Boiler Sheets continue
doing well, this is less the case with Thin Sheets.
The Wire branch, though still rather dull, is more
confident. The steel works turned out a railroad
material have no reason for complaint, there
being a good run of orders and more in prospect.
At the low prices ruling machine shops, foundries
and boiler shops are booking orders enough to
keep them going.—*Borsenkalender.*

HOLLAND

ROTTERDAM, June 7, 1887.—Tin.—In sympathy
with London, Banca has improved to 37 1/4
guilder, and Billiton to 63 @ 50 kg. Following
are the official May statistics:

	1887.	1886.	1885.
Slabs.	Slabs.	Slabs.	Slabs.
Stock on warrants with the Netherland Trading Com- pany, Amsterdam.....	14,800	21,210	46,386
Stock on warrants with the Netherland Trading Com- pany, Rotterdam.....	15,709	10,478	14,580
Total.....	30,509	31,688	60,966
Stock of Billiton.....	24,383	17,214	39,624
Total stock in Holland.....	54,892	48,902	100,600
May deliveries of Banca.....	9,128	11,080	9,134
May deliveries of Billiton.....	6,650	7,761	10,701
Total deliveries.....	15,778	18,841	19,835
Banca afloat.....	9,000	18,600	4,800
Stock in company's hands awaiting future auctions.....	68,078	67,593	108,202
Billiton afloat.....	23,400	23,575	33,706
June 1, price of Banca.....	fl. 63	fl. 59 1/4	fl. 53
June 1, price of Billiton.....	fl. 62 1/4	fl. 59 1/4	fl. 53 1/4

—Koch & Fierboom.

SPAIN

BILBAO, May 28, 1887.—Iron Ore.—Only one large
transaction has taken place during the week,
prices remaining unaltered at 6/9 @ 7/7 for Cam-
panil, and 6/6 Rubios. Large amounts have been
shipped. Total shipments to date, 1,845,728
against 1,377,550 in 1885. Pig iron has moved off
steadily, both for export and coastwise.—*Bilbao
Maritimo y Comercial.*

EAST INDIES

SINGAPORE, May 4, 1887.—Tin.—The business of
the fortnight has again been exceedingly small,
owing to the scarcity of supplies, and there is
still no stock of importance. Sellers ask \$38 50.
Tonnage.—Steamer rates to London are higher;
weight is quoted 37/6. For New York the Feliciano
Antonio P. has been placed in the hands of the
Hookey is said to have been chartered on
secret terms. Exchange is weak at 3 1/2% for six
months' sight credits. Shipments from the Straits
Settlements to the United States during the first
four months have been 28,000 piculs, against
21,861 last year; 12,989 in 1885; 22,857 in 1884;
38,866 in 1883, and 39,175 in 1882.—*Gilfillan, Wood
& Co.*

COLOMBO, May 5, 1887.—Plumbago.—Has been
moderately active and steady at the following
quotations in rupees per ton. Latex, Lump, 135
@ 150; Ordinary Lump, 115 @ 125; Chips, 82 @
90, and Dust, 42.50 @ 50. Shipments since October
1, to England, 4,119 cwt.; to Hamburg, 504 cwt.;
to Antwerp, 309; to Bremen, 1314; to India, 170,
and to the United States, 77,078; together 129,125,
against 110,074 in 1886; 104,004 in 1885, and 115,800
in 1884. Exchange, six months' sight credits,
1 1/4%.—*Falkner Brothers.*

At the last meeting of the British Physical
Society a paper was read on "The Production
of Sudden Changes in the Tension of a
Wire by Change of Temperature," by R.
H. M. Bosanquet, M. A. A very fine hard
drawn platinum wire, four or five feet long,
was used as a suspension for a ballistic gal-
vanometer, and exhibited peculiar phenom-
ena. The steel needles were replaced by
brass ones, and the peculiarities investigated.
When the room was warmed the needles
swung round nearly 70° for a few degrees
rise of temperature, and remained in about
the same position for further rises. If it
was now cooled a few degrees—3 or 4° F.—
they quickly returned to their initial posi-
tion. The author has not found a complete
explanation, but believes it to be due to un-
equal expansion and loose contact among
molecules.

GEO. W. CHURCH.
GEO. W. MONTGOMERY.

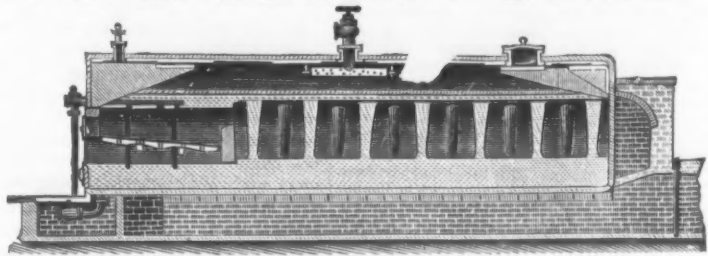
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English Letter.

(From Our Regular Correspondent.)

LONDON, June 6, 1887.

AFTER THE HOLIDAYS

came to an end last week matters resumed their usual channels, and have since been very quiet. As regards values, a late portion of this report will give you more detailed notions, but I may say here that the complaint is chiefly as regards the exceeding minuteness of profits rather than the smallness of the turnover. In the majority of instances firms in the iron trade are not specially dissatisfied with the quantity of material they are producing, but allege that it is almost impossible to make what they term a "living profit." All the old-fashioned distinctions seem to have been swept aside, and there is the keenest possible competition between Staffordshire and Cleveland or Derbyshire and Lancashire in bars, hoops, &c., whereas in the "good old days" these several districts were supposed to each produce a class of iron which was so distinct as not to compete with anything else. Besides the fierce home competition, there is the rivalry of the Belgians to meet, and that is probably the worst of all. The Belgians turn out some good but a great deal of bad iron, and many of them are said to be not very particular about trade marks. They are fond of branding the "Best Refined Rupee" which is so well known and much appreciated in India, and some of them (no worse, I fear, than some British ironmasters) mark "Best Refined" on iron which is as far from being best refined as any iron can possibly be. A movement is on foot to keep this iron, so branded, out of India, on the ground that the mark was originally that of the East India Company—the great defunct "John Company"—and is to all intents and purposes a British mark, invented and meant for British iron only. We shall see whether this prohibition ever comes into existence. Personally I don't think it will.

The Canadian tariff is causing much anxiety here, and there is endless cabling between manufacturers on this side and buyers in the Dominion. The new duties in many cases really affect contracts, but in others they are being made the excuse for getting out of all sorts of bargains. Why the Canadians should be in so desperate a hurry is a puzzle to most people, especially seeing that they have at present really nothing to "protect." Britishers are all the more angered by the rumor that the Canadian Government offered to discriminate in favor of British goods to the extent of 10 per cent. lower duties, but were forbidden to do so by the home Government. A debate in Parliament will probably be raised on this point, in which case I fancy there will be an explosion of public opinion which will greatly disturb our ultra free traders. The fair traders claim to be making steady progress with their cause, and allege that at no distant date they will hold the balance of power at the elections. They are undoubtedly very persistent, and if the coming harvest should be a bad one—which is feared, owing to the very late season—they are sure to make many converts among the agricultural classes.

THE IRON MARKET

has shown no improvement. With the Continent a fair amount of business has been done, but it has not reached the expectations which were raised by the character and number of inquiries recently made. On the Glasgow market the tone has been firm and on the whole upward in tendency. Shipments have been small, while, in spite of large weekly additions to the stocks, more furnaces have been blown in. Warrants closed at 41/11 1/2 per ton. On the West Coast there has been no change worthy of mention, and nominal quotations remain as of late. Makers, being well sold forward, still decline to follow speculative figures. In Cleveland buyers have had some difficulty in inducing makers to agree to their terms, and it is not improbable that still more difficulty will be experienced shortly. Meantime business in No. 3 G. M. B. has not been transacted under 34/ per ton, and some makers have held for 35/. In Staffordshire a despondent tone has taken hold of the market, and in view of recent failures there is much uncertainty of what will happen next. For the moment, therefore, it is difficult to gauge the position thereabouts. Sheets, both black and galvanized, are only in moderate request, while for bars, hoops, rods, &c., the demand just now is quiet and barely up to the low standard of recent months. Prices are for the most part governed by specifications, and are difficult to quote. In the heavy manufactured departments there is rather more doing, and not a few of the works are well employed. In old scrap and iron rails the business done has been but small. Offers have been made from the United States, but on such a basis that holders would have nothing to do with them. Rates, f.o.b., are: Old rails, 51/ @ 55/; heavy wrought scrap iron, 45/ @ 47/; old iron fish plates, 60/ @ 65/ per ton.

Freights for pig iron from Glasgow to New York, by ordinary steamer, remain steady at 7/6 per ton. From this side to other ports of the United States they are uncertain and not easy to fix. Steel keeps most of, if not all, the works well employed, and the prospect, generally, is encouraging. The orders for the armor plates for H. M. S. the Nile and the Trafalgar have been placed with John Brown & Co., Limited, Sheffield. The steel sleepers required by the Bengal and Najpur Railway Company, originally announced as about 10,000 tons, have been increased to about 14,000 tons, one-half of the quantity being given to Boleknow, Vaughan & Co., Limited, and the other half to the Anderson Foundry Company, the prices being between £4. 7/6 and £5 per ton f.o.b. The fish-plates required for the same railway, amounting to about 750 tons, have, it is believed, been placed with the Rhymney Iron Company, Limited. Blooms are quiet, the price being from 72/6 to 75/ f.o.b. Basic billets are quoted 75/, and Siemens-Martin billets at 92/6 per ton, f.o.b. Glasgow.

Steel rails are quiet, but 18,000 tons for the Bengal and Najpur Railway Company have been given to Boleknow, Vaughan & Co., Limited, at about £4. 1/6, or a trifle better per ton f.o.b. The quantity was first named as 12,000 tons, but, as in case of the sleepers, the total was raised by some 50 per cent. Most of the makers are well filled with work for the next two or three months.

SCOTCH PIG IRON

is a little steadier, owing in a great measure to covering purchases made by "bear" operators. The shipments have been so poor for some weeks past that for the year up to date they show a decrease of 820 tons, as against the increase shown hitherto. There are 80 furnaces at work, as compared with 84 a year ago. In Connal's stores there are 879,353 tons (an addition of 2801 tons last week), as compared with 711,022 tons a year ago. Warrants are 41/11, against 38/7 this date 1886. The importations of Middlesboro' pig into Scotland are 14,163 tons ahead to date this year.

MIDDLESBORO' PIG

is rather firmer, under good shipments and the steady resistance to the bears offered by the makers. It is rumored that this resistance is likely to take a more tangible form shortly.

HEMATITE PIG IRON

is fairly steady and inclined to stiffen owing to several fresh American inquiries and the continued large consumption at home by the steel works. There are 54 furnaces at work in the district, against 43 a year ago. In the stores only there are 181,772 tons of pig, an increase of 49,679 tons this year. Shipments of pig iron have increased by 10,886 tons, and of rails by 84,448 tons to date this year.

TIN PLATES.

In London the holidays have interfered with business, consequently I have little or no change to report. American buyers are placing about an average number of orders. I quote ordinary IC cokes, f.o.b. Liverpool, 12/9 @ 13/ per box. At Liverpool, despite the suspension of business during the Whitsuntide holidays, the tin-plate market has been, on the whole, pretty busy and steady. The prices of Bessemer steel cokes and coke tin plates are steady at from 13/ to 13/6 IC, for the former, and 12/9 @ 13/3 IC for the latter, with some of the better class brands at 13/4 1/2 and 13/6 IC. Bessemer charcoal are 14/ @ 14/6 IC. Siemens steel charcoal, 15/ @ 16/ IC, and best charcoal, 16/6 @ 17/6 IC. The demand for tines is steady, and a few orders have been booked at 12/3 up to 14/ IC. Coke tin wasters continue to be in fair demand at 12/3 @ 12/9. Quotations, generally speaking, are maintained firmly, and for forward delivery there are not many anxious sellers. Best charcoal range from 16/ to 17/6 IC. The demand for tines plates is not very brisk. Tines are 24/6 @ 27/6 for the large sizes, and wasters, for which there appears to be an ever-increasing demand, are 23/ @ 24/. Coke tin wasters, as well as Bessemer steel coke wasters, are in great demand at 12/3 @ 12/9.

THE HARDWARE TRADES.

In London there is a sickliness about the hardware trade which is not reassuring. It is somewhat amusing to observe the attempt to decry jubilee articles because the name has become so common and the singular exercise of ingenuity to obtain attention for specialties by a process of fashion or contrast with former practice. In the gas-fitting department great preparations have been made to meet the probable demand for illumination devices, and as on former occasions of national rejoicing the bulk of the business is done during the last 10 days or fortnight previous to the event, so it will be in all probability on the present occasion. At Birmingham, owing to the unfavorable weather, the Whitsuntide holidays brought less than their usual "compensation for disturbance" to local industry. On the other hand, the suspension of work at the workshops or factories was not so marked or prolonged as usual, and by the middle of the week manufacturing industry had practically regained its normal channels. Business, however, cannot be described as brisk, either for home or export, and the losses arising from bad debts in too many cases sweep away the meager profits obtainable where competition is unchecked. The jewelry trade in particular has suffered very seriously of late by the failure not only of wholesale factors and merchants, but of retailers, and both jewelers and saddlery manufacturers will suffer, I understand, by a failure announced this week. Spain has been a good market of late for jewelry as well as general hardware, but it is still open to extensive cultivation by English traders. The new Canadian tariff has caused a very sore feeling among merchants and manufacturers, more especially as the enhanced duties are put in operation provisionally before the bill is passed. The general feeling is that Canada is paying dearly for the luxury of an iron industry of her own, as the magnitude of the duties is the measure of the excess price, and must be paid for Canadian over English products. At Sheffield the lighter industries are tolerably well employed, although the slackness in cutlery and plating recently noticed continues, and the late spring is accountable for a less active demand for agricultural tools. Fair orders continue to be received for railway rolling stock, among which is one for several thousand tires for one of the State railways in India. This has gone to Messrs. Cammell. The firms devoted to the manufacture of war material are also busy. It is understood that Sheffield firms will tender for the supply of the 3500 6-inch and 360 8-inch steel shells which the Government are about to order. In all classes of edge tools a more active demand has prevailed during the last few months. The home trade is not particularly brisk, but orders come in fairly well from the foreign and colonial markets.

The effort to establish a line of first class new steamships between New Orleans, Aspinwall and ports in the United States of Colombia meets with encouragement.

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For 2 1/2, 2 3/4, 3, 3 1/2 inch Tire.

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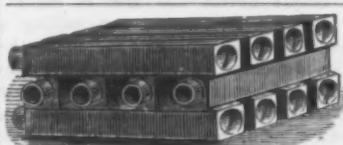
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The Iron Age

AND METALLURGICAL REVIEW.

New York, Thursday, June 23, 1887.

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The Influence of Work Upon the Quality of Steel Plates.

The results of a particularly valuable series of experiments have been put before the metallurgical public through a paper read by Mr. James Riley, of Glasgow, before the Iron and Steel Institute. The range of inquiry was a large one, and was accompanied by a voluminous record of tests, for which we must refer to the original document, briefly summarizing the conclusions reached and the points brought out in the discussion. Mr. Riley cast a number of different sizes of ingots of steel carrying 2.18 carbon, 0.03 silicon, 0.04 sulphur, 0.06 phosphorus and 0.48 manganese, a mild metal of certainly good quality, chemically. From one charge we obtained two 24 x 15 inch ingots, two 14 x 14 inch ingots, four 18 x 12 inch ingots, and four 12 x 6 inch ingots. The larger ingots were treated by either reheating or by soaking, and after hammering to 8-inch slabs, were rolled into 1-inch, ½-inch and ¼-inch plates in sets, one set being rolled in one direction only, while the other was submitted to cross rolling. The 18 x 12 inch ingots were both reheated and soaked and hammered or cogged down to either 8-inch or 4-inch slabs, which were converted into the same sizes of plates by cross rolling. The smallest ingots were all reheated, but some of them were hammered, while others were bloomed down to 4-inch slabs, rolled again into the different sizes of plates. It will be noted, therefore, that the same material was treated in a number of different ways under practically like conditions.

The points on which it was proposed to shed some light were the following:

1. The effect of different amounts of "work" done on the ingot and slab in making plates.
2. The comparative results due to "reheating" or "soaking" ingots.
3. The results of "hammering" compared with those of "cogging" the ingot, or

"blooming," as the latter operation is usually called in this country.

4. The merits of "cross-rolling" as compared with "rolling" in one direction only.
5. The results due to annealing.

Mr. Riley's results are most interesting, bordering almost on the sensational, so far as the question of the necessity of "work" is concerned. It has been generally held by steel manufacturers that, in order to obtain a reliable product, the thickness of the ingot must be about 20 times the thickness of the plate, and we know of a conspicuous instance in connection with recent armor-plate contracts where the difficulty experienced in coming up to specifications regularly was attributed to lack of "work," which was followed by modifications in the blooming train so as to make it capable of handling larger ingots. Mr. Riley's tests indicate that within a certain range additional work is of doubtful utility, and it is apparent that practice generally is in the direction of overdoing it. He says: If you want a strong steel without caring greatly about its ductility, put abundance of work upon it; but if you desire a plate of medium strength and of high ductility, do not put an excessive amount of work upon it, and if you would increase the ductility, anneal it carefully after rolling. Mr. William Parker, of Lloyd's, in the course of the discussion, cited a very interesting case, which would indicate that mechanical work is not so urgent a necessity as is generally believed. From a 6-foot ingot, he had cut slices 15, 12½, 10, 7½, 5, 3, 2 and 1 inch thick, all of which were hammered and rolled into ½-inch plates. Without giving the detail of every test, Mr. Parker stated that the plate rolled from the 15-inch piece showed a tenacity of 25.9 tons, and an elongation of 26 per cent. in 8 inches, while the figures for the 1-inch slice were 26 tons and 27 per cent. respectively. The same authority quoted figures showing exceptional quality in steel castings, and alluded to the results attained at Terrenoire in the same direction, the evident drift of his convictions being that by chemical means the steel may be made in so perfect a manner that mechanical work is necessary to a far less extent. Steel makers and users will have some doubts as to the expediency of trusting to freedom from structural imperfections in the ingot, to the extent of entirely abandoning the subsequent corrective measures of mechanical work, but thoughtful managers will in their own cases consider whether they can, without sacrificing that sense of security which reliability of product gives, reduce cost by decreasing the quantity of work—or, in other words, start with lighter ingots. The question has another very important bearing, especially to us, and that is, whether in order to produce heavier plates it is so absolutely necessary, as has hitherto been thought, to increase the power of machinery with the object of putting "work" into the material.

On the question of the relative merits of reheating furnaces and of soaking pits, Mr. Riley's experience on the whole indicates very little difference, while Mr. Snelus, who during the discussion took the ground very emphatically that, so far as quality of product is concerned, the material dealt with in the soaking pits turns out to be better, while there is an important advantage in the lessening of waste by oxidation to a very low percentage. Mr. Snelus's explanation for the better quality of steel taken from a soaking pit was that the ingot is not disturbed from the position in which it has been cast, and that therefore it will solidify much sounder. Against this claim the point was raised that the slow solidification, without change of position, is likely to promote those liquation phenomena, to which Professor Cheever, of Ann Arbor, Mich., has called attention. The soaking pit of the Gjers type has not found much favor in this country, while what are practically vertical reheating furnaces have been more widely introduced. The suggested danger therefore applies to them also.

On the question of cogging or blooming versus hammering, Mr. Riley's results confirm the convictions which are the basis of prevalent American practice, that there is in reality very little difference. Some consumers, notably of rails, have persuaded themselves into the belief that all that was required was to return to "old-fashioned hammering" of ingots to get ideal quality, a position which American metallurgists have stoutly maintained to involve a useless increase in the cost.

Concerning cross-rolling Mr. Riley says: "Comparing the results of cross rolling with those of plates which were rolled only in the direction of the length of the ingot, although there is a clear balance in favor of cross-rolling, yet the difference is not so great as one would perhaps have anticipated. The tests, taken lengthwise of the plates, are about the same in both cases, but in those taken crosswise, although strength is practically equal in both cases, yet the ductility is decidedly in favor of cross-rolled plates." That dictum is certainly not in favor of the practice of cross rolling, in view of the additional cost it involves. On the much-disputed point of annealing our authority says:

I have made one or two remarks showing the usefulness of this process as a corrective to damage done to plates in various ways, and I would strongly emphasize its importance in all cases where plates are distorted or altered in form while subjected to only partial heating. It is essential that immediately after such work is done the plate shall be annealed. But what do we mean by an-

nealing, and is it useful in all cases? To take the latter question first, I am clearly of opinion that, in so far as refers to the ordinary operations of an efficient steel works, annealing is not necessary, and, if carried out, is of doubtful utility. If care is taken that the piece is delivered hot from the rolls—not too hot—and that subsequently it will be exposed to partial chills, I do not think it will be improved by annealing. But if you are dealing with heavy masses, with extra-thick plates, or with pieces which have been finished too cold or which have been afterward subjected to deterioration, then I think it wise to anneal. But this should be done with great care—care to see that, while heated sufficiently, the piece is not subjected to such a high temperature as will—according to Chernoff and others—prove injurious and necessitate further "work" being put upon it to restore it to its best condition—care to see that this reheating and the subsequent cooling are not done too slowly, and so the piece subjected to the injury of being "stewed" or "roasted," as elsewhere referred to—care to see that this reheating is done uniformly throughout the piece. In view of the possibilities of damage due to so-called annealing, as we know it is ordered in some cases to be done, and as it is frequently carried out, I repeat that, on the whole, in all ordinary cases I prefer to have the piece well finished in the mill, and to have it kept in that condition so long as I am responsible for it.

From all the evidence submitted it would appear that, if properly treated, mild steel plates do not require annealing at the steel works, but it is valuable as a safeguard against accidents in finished work after having passed through the hands of those who have shaped it. It is possible that the time may come when those who do the latter have so far learned how to handle the metal that they need not apply the corrective of annealing, unless in exceptional cases. That time is probably still far in the future, and until safety demands its application even in cases where its absolute necessity may be questioned.

The Position of Tin.

Since October, 1885, the era of speculation in merchandise reopened on both sides of the Atlantic, being the natural sequel of a period of unprecedented depreciation of all raw material in 1883, 1884 and 1885. Silk, wool, coffee, india rubber, tin, cotton and wheat have had their turn, every one of them being capable of control at leading centers of distribution, at least for a time. It is therefore a matter of interest for the consumer of merchandise to at times examine the statistics of articles not too unwieldy to be temporarily controlled by the speculative element. Tin, always a favorite with operators, has for a month or two past again attracted considerable attention, and fluctuated widely. The arguments advanced by operators for a fall evidently were not very weighty; neither the North of Spain nor Dakota are regions from which much of a supply need be looked for in the near future. The Biliton supply, it is true, has been steadily on the increase, so much so that the Batavia sales will henceforward, in all likelihood, embrace regularly 15,000 piculs instead of 11,000, but this increase will, from all appearances, be counterbalanced by a decrease at the Straits, if we are to judge from late reports received from there. So far as can be seen at this writing the world's consumption will for the latter half of the year have about as much tin at its disposal as it had last year. Should consumption be much larger than in 1886, as some in the trade seem to firmly believe, the statistical position would go on improving and enable operators for a rise to push the price still higher. Too large an advance would, on the other hand, in its turn diminish consumption. Thus the deliveries in England and Holland in May, when the price had been so much enhanced, declined to 1647 tons from 1930 tons in April. Following are particulars of the statistics as furnished from London:

	Tons.	Tons.	Tons.
	Apr. 30, 1887.	May 31, 1887.	May 31, 1886.
Straits and Australian, spot.	9,053	8,736	5,461
Straits and Australian, landing.	857	853	461
Straits, afloat.	1,928	1,110	926
Australian, afloat.	303	471	779
Banco, on warrants.	511	956	940
Biliton, spot.	667	739	589
Biliton, afloat.	1,015	791	737
Stocks in America, including quantity afloat.	2,910	2,281	1,500
Total.	11,332	10,847	11,853
Prices of Straits and Australian.	£102. 15/	£104	£97. 15/

The net import into the United States during the first 10 months of the fiscal year amounted to 11,630 tons, against 10,972 tons during the corresponding period of 1886. Shipments from the Straits Settlements to the United States during the first four months of the current year have been 28,004 piculs, against 21,861 in 1886. Messrs. De Monchy & Havelaar, Rotterdam, in their monthly circular, dated May 31, write: "The production of Biliton for 1886-87 (from May 1, 1886, to April 30, 1887) amounts to 89,192 piculs, against 81,052 piculs in 1885-1886; against 61,357 piculs in 1884-1885; against 70,974 piculs in 1883-1884; against 70,031 piculs in 1882-1883; against 66,331 piculs in 1881-1882; against 78,928 piculs in 1880-1881. The average production during the last 10 years is about 75,800 piculs. A public sale of about 15,000 piculs will be held at Batavia on June 29 next." An element of strength in the increased consumption of tin plates, of which into the United States alone 200,142 tons were imported during the first 10 months of the fiscal year, against 195,370 during the corresponding period of 1886, yet leaving comparatively little stock either in port or in the interior. As matters stand, the outlook for tin seems reassuring enough, even though at ruling rates it cannot be called cheap.

The Need of Greater Publicity in Railroad Management.

In our last issue we gave briefly the practical grounds for the belief that some governmental regulation of railroads and other corporations was expedient. Aside from general laws like the Interstate bill, what other legislation can be safely ventured upon? We cannot enact laws which, while doing away with acknowledged evils, would also stop the good by checking legitimate enterprises. And yet much might be accomplished by indirect legislation. It is an open question whether, upon every board of directors of corporations created by charter or enjoying a franchise, there should not be some member, nominated perhaps by Boards of Trade, but appointed by the city or State. These members need not necessarily be owners of any stock, and in all deliberations should represent the public interest which the corporations were created to serve. We do not think that merchants should control railroads, nor do we think that railroads should so absolutely control merchants. This representative of the public could not outvote his fellow directors, but his voice and influence, through the sunlight of publicity, would go far toward checking any unwise scheme which might be planned in secret session. There is no need of so much corporate mystery. Transportation, for example, is sometimes conducted as if good business men, however competent to judge of commercial questions, could not, for some unexplained reason, comprehend tariff problems. Generally we are not told the reasons why such and such things are done, only the decision is given us; thus, important changes may be made suddenly and without warning which may have far-reaching effects upon business.

An illustration may be taken from recent history: The trunk lines on April 1st adopted a new classification which all are agreed was very crude in many particulars. It became evident that it must be modified, and the classification committee, composed of the traffic managers of the different railways, have for a fortnight been in secret session. Although it is expected that as many as a hundred important changes will be made, and that the classification as amended will go into effect on July 1, yet not a hint of the discussions and the decisions has reached the public. It is acknowledged that no railroad officer can be an expert in the many lines of business whose goods he carries and for which he fixes the freight rates; yet not a single representative or committee from any of these various trades have been invited or even allowed to appear before this railway committee and explain the practical workings of freight charges upon the special lines of business about which they have full and exact knowledge. In putting the matter in this light we desire to say that we have every confidence in the honesty and business ability of our railway managers; we simply think that, in undertaking to regulate the important matter of freights for all lines of traffic without assistance from the business men who are so deeply interested, they are undertaking a task beyond the powers of any body of men however able. Why should the deliberations of this classification committee be so secret? Does not the importance of the business interests involved justify a public discussion of rate and classification questions, or at least the presence on this committee of some one authorized to speak for the merchants and manufacturers? It is a truism to say that the interest of shipper and carrier are really identical; as an aid to harmony, let some plan be devised by which each will be enabled the better to understand the other's position.

Such a public representative upon boards of directors would have one effect which should not be overlooked. The plan would make less likely any debasing of the office to private ends. In years past, ugly rumors have been afloat of the "deals" by which directors and officers have enriched themselves at the expense of stockholders and investors. Stories are often told how stocks have been forced up or down by hints of prosperity or disaster which could not be verified, but which could be turned to great advantage in buying or selling by any one inside the ring. In a word, we have often heard how directors, for their own profit, have been false to their trust and to the public. Another great evil has been the formation from the members of a railroad directory of rings controlling a business with which the railroad is closely connected. A familiar instance is that of coal mines. A railroad may be forbidden to engage in any other business, yet by this simple device the law is made a dead letter. The same men, sitting in one room as a railway board and in another as the directors of a mining company, may make any traffic arrangements with themselves they please, and, under our present system, the public be not one whit the wiser. Nor is this all. A mine owner some years ago was approached by a representative of his connecting road, asking him to sell out. The owner declined, whereupon the agent said it would be the worse for him. His coal suddenly became more expensive to carry than that of any other mine; he could get no cars—they were all engaged. The hundred annoyances, which are so difficult to prove unjust and which are so convenient to the hand of the manager bent upon destroying a business, were all inflicted upon him. At the end, he was forced to sell his

mine to members of the railway ring or go into bankruptcy.

This is not an isolated case in the history of mining, while if the rumor be true, the same tactics have under varying conditions been applied to other departments of railroading. It is asserted that the high rates on dressed beef have been at least partly caused through the influence of railway officers who are private owners of the stockyards at which live cattle are compelled to feed and which have, until recently, returned enormous profits. The opposition of certain influential railway men to the improved cars for live stocks whereby feeding is managed without unloading, has been traced to the same cause. Whether true or not, it is unfortunate that any color is lent to the allegations by private ownership of any necessary part of our railroad system. For all these cases, and many more which might be mentioned, the question naturally arises why the profits of a business so closely connected with transportation do not legitimately belong to the railroad company, or why, as in the case of coal mining, two lines of business should not be kept forcibly apart? Happily many of the grosser forms of these evils have passed away, nevertheless the possibility of the existence of corporations interlocked through boards of directors, or through bargains between the boards and individual members, must always be a menace to the interests of investors and the public. What legislation can reach the trouble without doing injury to legitimate business? We can only suggest compulsory publicity.

The Great Chicago Building Strike.

The dispute between the Chicago builders and their workmen has now continued for five weeks. In only one direction does there appear to be any hope of its early termination. The bricklayers' union is reported to be in financial difficulties, and overtures for an appeal to arbitration have been made by the leaders of that body. As the master masons professed their willingness, at the beginning of the strike, to submit questions not involving fundamental principles to settlement by such a tribunal, it might be supposed by disinterested observers that such a concession by the strikers would be received in a friendly spirit by the employers. But this is not the case. The latter evidently believe that the workmen are weakening, and with the usual exultant feeling of conquerors, the master masons now demand an unconditional surrender. Public sentiment has hitherto been on the side of the employers, as the gradual progress of events in the Chicago building trades had for years tended to the obliteration of all their rights, and the public naturally sympathized with the efforts made to obtain proper control of their business operations. The arrogance of the labor leaders in refusing arbitration intensified this sentiment. Now, however, there is every prospect of a revulsion of public opinion in favor of the strikers, if this opportunity to settle the trouble in a friendly way should be scornfully rejected by the builders. It is felt that an attempt to completely break the power of the labor organizations will, if successful, simply result in transferring the absolute control of labor from the leaders of the unions to the builders. The effect of the present stagnation in building operations is too widespread to treat this question solely as a contest between two sets of persons interested in the employment of labor. The public would, above all things, desire to see this grave difficulty settled upon a basis of mutual concessions, insuring a continuance of peaceful relations between employers and employed for a long time to come.

In the meantime a constant effort is being made by the builders and the labor leaders to secure every advantage possible. A few large buildings are in process of erection in various parts of the city under permits granted by the Builders' and Traders' Exchange, employing such mechanics as are willing to comply with the regulations established by that body. Other buildings have been taken by their owners from the hands of contractors who were unable to secure non-union men and unwilling to employ union men, and have been handed over to committees of labor organizations for completion. Conflicting statements are, of course, in circulation relative to the progress made in these diverse directions, but the combined progress is very unsatisfactory to those who are anxious to see the building industry assume its normal activity. The absence of general attempts at intimidation of non-union workmen is a pleasant feature of this bitter struggle. It occasionally happens that a zealous union workman endeavors to influence non-unionists to cease working, and will add force to clinch his arguments. A few such cases have been reported to the authorities, who have acted with commendable promptness in protecting non-union workmen from interference. But there has been a notable absence thus far of appeals to mob law, and the strikers have by this very forbearance gained many friends. A peculiar phase of the labor complications was developed last week. The employing carpenters are endeavoring to establish a uniform working day of nine hours, in conformity with the regulations of the Builders' and Traders' Exchange. Upon the promulgation of an order to that effect the employees of one contractor threatened to strike unless they were permitted to work

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THE IRON AGE.

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for 10 hours, which they desired to do in order to earn more money, being paid by the hour.

A Glimpse at Canadian Business and Resources.

The annual meetings of the banks in Montreal afford an occasion when some of the shrewdest financiers in the Dominion give free expression to their views respecting the solid interests of the country, their present condition and prospects. The full report of the president and managers of the Merchants' Bank of Canada is at hand. The opening paragraphs are expressive of satisfaction that the earnings of the year were 10 3/4 per cent., as compared with 9 per cent. in 1886; but in regard to the country at large opinions are carefully qualified. The year has not been a bad one, for there are marked indications of growth and prosperity in many quarters. The effect of a hard winter, however, is seen in deferred payments, frequent renewals and loss of market for certain classes of goods. The profits of the lumbering trade are reduced, and it is to be noted that the total number of failures is increasing. The total amount in 1887 was \$5,700,000; in 1885, \$8,861,000; in 1886, \$10,386,000. For the first quarter of 1887 they were \$3,602,000. If continued at the same rate through the year the total for 1887 will be \$14,400,000. In the disastrous years ending with 1879 failures ran up to such totals as \$23,000,000, \$25,000,000 and \$29,000,000, but a list this year swelling to even half these amounts we are told is not pleasant to contemplate. Exceptionally low prices for agricultural products enables the laboring classes to live cheaply, which is an advantage to the consumer. Dairy products alone are an exception. If important interests are depressed in some instances, recovery is looked for. In the Northwest it may not be as rapid as some have anticipated. President Andrew Allan, in making these statements, significantly adds: "If I say that the prospects are good generally, it will be no justification for men to venture beyond their means into imprudent lines of operation, even in their own business; nor, if I say that the aspect is clouded, will it be any justification, either for politicians or any others, to say that the country is 'going to the dogs.'" A reciprocity treaty with the United States, we are told, would be for the advantage of both parties; "but Canada does not need to supplicate for it," as it is a pure matter of business to be arranged on a rational basis. Of manufactures there has been an important development, but there is a lack of statistical information relating to foundries and implement works.

The Dominion, as a whole, is supposed to be fairly prosperous. Assuming this to be true, without speaking particularly of every part, the veteran bank president mildly suggests that men of business will not presume on their power to borrow much additional money from the banks, whose available resources are \$6,000,000 less than a year ago, while their loans and disbursements are \$3,000,000 more. In the perusal of views thus volunteered by leading men in the Dominion, close observers of events in the world of trade and finance, there is much to be discerned between the lines. The heavy weight of public indebtedness proportioned to resources, the magnitude of public works to be maintained and prosecuted, the ambition that prompts to still further expansion in various enterprises, the condition of unrest, not to say downright dissatisfaction, manifested by the Maritime Provinces in their isolation, the mutterings of discontent in far-away Manitoba—all these are considerations that enjoin a policy of cautious moderation on the part of all who are engaged in the marts of trade, equally with those who are in official positions at Ottawa and in the provincial banks.

There was a slight break in the ranks of the coke strikers in the Connellsville region last week. About 300 Hungarians employed at the Jintown and Sterling works of the J. M. Schoonmaker Coke Company returned to work at the old rate of wages. What effect this action will have on the balance of the strikers remains to be seen. It is estimated that there are 4000 Hungarians, including a few other foreigners allied with them, in the Connellsville region. Should the balance of these men conclude to resume work, and it is stated that they will do so the present week, it would seem that the struggle would be settled. The operators claim, with great confidence, that the present week will see the greater part of the ovens in the region in operation again.

The Lebanon Implement Company began drilling at Lebanon, Ky., for natural gas and oil, about June 1st, and have now reached a depth of 700 feet. A great deal of excitement and interest is now manifested as the cleanings from the well begin to give off a strong odor of oil and gas. For a number of years both oil and gas have been encountered more or less when sinking wells of considerable depth, but no earnest effort has ever before been made. This part of the State is rich in iron and timber, and if in natural gas, a cheap fuel is found, great wealth awaits some one who has the capital to develop our resources. There is a fine bed of iron ore within 1 1/2 miles of our little city that assays 60 per cent. pure iron. Other beds are said to be even richer.

It is rumored that the Huntingdon Car Works, at Huntingdon, Pa., which have been idle for about four years, will be purchased by a party of New York capitalists, and put in operation again.

The Iron Scale as Proposed by the Men.

The following are the principal features of the scale of wages for the coming year ending June 30, 1888, proposed by the National Amalgamated Association of Iron and Steel Workers, now under discussion. We have omitted those parts in which no change has been made in last year's scale:

In the memorandum of agreement the following are inserted:

- When old rails are worked into finished iron and the waste exceeds ordinary runs, the workmen shall be paid an equivalent to a turn's work of muck iron made into similar shapes and sizes.
- Nine (9) hours shall constitute a day's work, and in no case shall it exceed ten (10) hours.
- For all crop ends on finishing mills used for merchantable purposes the same shall be paid for.
- On all mills the company shall furnish help to the heater on all iron or steel weighing 160 pounds or over.

Boiling.

The following are the present and the proposed prices, per ton of 2240 pounds:

Card rate.	Old price.	Proposed price.	Advance.
Cents.	Dollars.	Dollars.	Per cent.
2	5.00	5.50	10
2.1	5.10	5.60	9.8
2.2	5.20	5.70	9.6
2.3	5.30	5.80	9.4
2.4	5.40	5.90	9.3
2.5	5.50	6.00	9.1
2.6	5.60	6.10	9.0
2.7	5.70	6.20	8.8
2.8	5.80	6.30	8.7
2.9	5.90	6.40	8.5
3	6.00	6.50	8.3
3.1	6.10	6.60	8.2
3.2	6.20	6.70	8.1
3.3	6.30	6.80	7.9
3.4	6.40	6.90	7.8

It will be observed that from 2 to 2.6 cents card, the advance ranges from 10 to 9 per cent. The higher rates which have little interest now, and which are carried forward by 10ths of 1 cent, also show a greater advance.

The following additions have been made to the scale:

1. The two weeks' output of boiling furnaces shall be averaged and limited to 27,500 pounds, double turn, and 35,000 pounds, single turn, for single furnaces, and no turn shall exceed 2550 pounds; and the firm shall hang out a slate the day before pay-day giving the weight of each furnace.

2. For working burnt castings in a boiling furnace the price shall be \$1 per ton above the straight price paid for boiling.

3. In all mills where muck iron crop ends are being worked on cinder bottom for the purpose of rolling the same into tool iron, the price shall be \$1 per ton above the price paid for scrap, the same to rise and fall with the scale.

6. The price for boiling dephosphorized iron shall be \$1 per ton above common iron price, the same to be paid for at the rate of 500 pounds per heat when rolled.

9. For wrought-iron turnings, worked on cinder bottom, \$3.57 per ton (old rate, \$3.25), the price for working swarth or turnings to advance and decline in the same proportion as the boiler's scale.

13. All passable blooms coming from squeezer to be paid for, provided they are not worked through no fault of the boiler.

14. For small castings, except machinery castings, worked in a boiling furnace, whether with or without pig metal, 50 cents per ton extra shall be paid; if worked with pig metal, the 50 cents per ton extra shall be paid for the whole output.

15. For boiling iron in double-single furnaces having two doors on one side the boiler shall be paid at the rate of five heats for four.

Muck or Puddle Mill.

Percentage remains the same, but increase in boiling increases rate per ton.

When muck roll trains are changed for the purpose of changing sizes, or for the purpose of dressing, the roller and roll hands each shall be paid one day's work at laborer's wages for each set thus changed, but when a roll breaks the above rule shall not be applied.

Bar and Nail Plate Mill.

The following are the new and old prices per ton of 2240 pounds:

Card rate.	Old price.	Proposed price.	Advance.
Cents.	Cents.	Cents.	Per cent.
2.0	65	70	11.1
2.1	64 1/2	71 1/2	10.8
2.2	64	71	10.6
2.3	63 1/2	70 1/2	10.3
2.4	63	70	10.1
2.5	62 1/2	69 1/2	10.7
2.6	62	69	10.7
2.7	61 1/2	68 1/2	10.6
2.8	61	68	10.4
2.9	60 1/2	67 1/2	10.8
3.0	60	67	11.3
3.1	59 1/2	66 1/2	11.5
3.2	59	66	10.2

1. All flats three (3) inches in width or under, weighing less than two and one-half (2 1/2) pounds per lineal foot, shall be paid for at guide mill prices, whether worked on a two-high or three-high bar mill.

2. All sizes below one and one-eighth inch rounds and one inch squared worked on a three-high bar mill to be paid guide mill prices; but when such sizes are worked on a two-high bar mill ten cents per ton extra shall be paid above straight bar mill prices.

3. When making "J" or "L" iron on bar mill, for mower and reaper machines, twenty (20) per cent. extra shall be paid.

4. For piles with all old boiler plate, old sheet or old roofing iron, placed on top and bottom, pressed and tied together, and for piles with all old tool iron placed on top and bottom, price and one-half price shall be paid.

8. Catchers on nail mills not having more than one helper shall receive one-half of what the roller makes, he to pay his helper and no one else.

Old clause dropped: Heaters on 12-inch mill to receive bar mill price, to be paid by the company, and the following substituted:

Twelve-Inch Mills (New).

1. Heaters, rollers and catchers on twelve (12) inch mill shall be paid bar mill prices, except when rolling odd or fancy shapes and flats 3 inches in width or under.

2. When making flats 3 inches in width or under, weighing less than 2 1/2 pounds per lineal foot, the same shall be paid for at guide mill prices.

3. All sizes below 1 1/2 inch rounds and 1-inch squares worked on a 12 inch mill shall be paid for at guide mill prices.

4. The 12-inch mill scale shall advance and decline in the same ratio as the bar mill scale.

Guide, 10-Inch, Hoop and Cotton Tie Mills.

It is agreed that the base price at a 2-cent Western Iron Association's card shall be the straight \$2.00—old rate, \$2.66, as below—per ton for rolling iron or steel on a guide, 10-inch, hoop or cotton tie mill, with 2 per cent. additional for each 1/2 advance on said card from 2 to a 2 1/2 cent card, and for each 1/2 advance or decline above the 2 1/2 cent card 3 per cent. shall be added or deducted, as the case may be.

Size.	Old rate.	Proposed price.	Advance.
			Per cent.
3/4 rounds and squares.....	\$2.60	\$2.50	10.5
1/2 rounds and squares.....	5.36	5.90	10.1
3/4 and 7/8 rounds and squares.....	3.30	3.50	9.4
1/2 and 9/16 rounds.....	2.93	3.30	9.2
3/4 and upward.....	2.66	2.90	9.0
1/2 and 7/16 oval.....	4.82	5.30	10.0
3/4 and 9/16 oval.....	3.74	4.10	9.6
1/2 oval and upward.....	2.66	2.90	9.0
3/4 half oval and half rounds.....	4.82	5.30	9.7
1/2 half oval and half rounds.....	3.30	3.50	9.4
3/4 half oval and half rounds.....	2.66	2.90	9.0

Nut Iron.

Size.	Old rate.	Proposed price.	Advance.
			Per cent.
5-16 x 1/4 and 28-34 x 1/4.....	5.36	5.90	10.1
3/4 x 1/4 and 1-16.....	11.30	12.50	10.6
3/4 x 3/4 to 1-16 and 7-16 x 1/4.....	4.83	5.30	10.0
1/2 x 1/4 or thicker on two-high rolls.....	4.28	4.70	9.8
9-16 x 1/4 or thicker on two-high rolls.....	4.01	4.40	9.7
3/4 x 3/4 to 1-16.....	3.30	3.50	9.4
3/4 x 3/4 to 1-16.....	2.93	3.30	9.2
1 x 3/4 and upward.....	2.66	2.90	9.0

Channel Iron.

Size.	Old rate.	Proposed price.	Advance.
			Per cent.
2 and upward.....	2.66	2.90	9.0
1 1/2 to 2.....	2.93	3.30	9.2
1 1/2 to 2.....	3.30	3.50	9.4
3/4 x 5-16.....	6.98	7.70	10.3
3/4 x 3/4.....	3.74	4.10	9.6
3/4 x 3/4.....	3.30	3.50	9.4

T Iron.

Size.	Old rate.	Proposed price.	Advance.
			Per cent.
1 1/2 and upward.....	2.93	3.30	9.2
1 1/2 and upward.....	3.74	4.10	9.6
1 1/2 and upward.....	4.28	4.70	9.8
1 1/2 and upward.....	4.82	5.30	10.0
1 1/2 and upward.....	6.17	6.80	10.2

Angles.

Size.	Old rate.	Proposed price.	Advance.
			Per cent.
1 1/2 and upward.....	2.66	2.90	9.0
1 1/2 and 1 1/2 x 3-16 and 1 x 1/4.....	3.74	4.10	9.6
3/4 x 1/4.....	4.28	4.70	9.8
3/4 x 1/4.....	5.36	5.90	10.1
3/4 x 1/4.....	6.17	6.80	10.2

Clip or Wagon Strap.

Size.	Old rate.	Proposed price.	Advance.
			Per cent.
3/4.....	2.93	3.30	9.2
3/4.....	3.74	4.10	9.6
3/4.....	4.28	4.70	9.8
3/4.....	5.36	5.90	10.1
3/4.....	6.17	6.80	10.2

Hame Iron.

Size.	Old rate.	Proposed price.	Advance.
			Per cent.
3/4 x No. 10 and lighter.....	8.60	9.50	10.5
3/4 x No. 10 and lighter.....	9.98	10.70	10.4
3/4 x No. 10 and lighter.....	5.36	5.90	10.1
Band rolled specially for bundling.....	5.36	5.90	10.1

Ten-Inch Mill.

Size.	Old rate.	Proposed price.	Advance.
			Per cent.
1/2 and 9/16 rounds and squares.....	2.93	3.30	9.2
3/4 and upward, rounds and squares.....	2.66	2.90	9.0
3/4 ovals and upward.....	2.66	2.90	9.0
1 inch and upward.....	2.66	2.90	9.0
1 inch and upward.....	2.66	2.90	9.0

For working steel fagots on a guide or 10-inch mill the roughers shall be paid 20 cents per ton extra, the same to be paid by the company.

Hoop and Cotton Tie Mills.

Size.	Old rate.	Proposed price.	Advance.
			Per cent.
1 1/2 and upward by 1/4.....	3.07	3.35	9.1
1 1/2 and 1 1/2 x 1/4.....	3.30	3.50	9.4
1 1/2 and 1 1/2 x 1/4.....	3.74	4.10	9.6
1 1/2 and 1 1/2 x 1/4.....	4.28	4.70	9.8
1 1/2 x 1/4.....	6.08	7.70	10.3
3/4 x 1/4.....	8.50	9.50	10.5
3/4 x 1/4.....	9.08	10.70	10.5
3/4 x 1/4.....	11.30	12.50	10.6
Clips and Finger.....	3.20	3.50	9.4
Cotton tie and slats.....	3.74	4.10	9.6

All hoop rolled out of fagots shall be paid for at the rate of \$4 per ton for 1 1/2, and \$4 25 per ton for 1 1/4, with no percentage off.

To the old clause: "Heaters receive one-fourth and roughers, between, one-fourth" has been added: "and the night-turn roller one-fifth."

Plate and Tank Mills.

Card rate.	Old price.	Proposed price.	Advance.
Cents.	Cents.	Cents.	Per cent.
2	80	85	11.1
2.1	79 1/2	84 1/2	10.8
2.2	79	84	10.6
2.3	78 1/2	83 1/2	10.3
2.4	78	83	10.1
2.5	77 1/2	82 1/2	10.7
2.6	77	82	10.7
2.7	76 1/2	81 1/2	10.6
2.8	76	81	10.4
2.9	75 1/2	80 1/2	10.8
3	75	80	11.3
3.1	74 1/2	79 1/2	11.5
3.2	74	79	10.2

Clause 5 now reads:

Twelve and one-half (12 1/2) per cent. added for all strong iron or steel; but, when rolling steel the output shall not exceed that of iron, and should the output of steel equal the output of iron, the same shall be paid for at iron prices.

Sheet Mill.

The only change in the scale is that the clause "said advance or decline not to be operative below a 25-cent card" has been dropped, so that the advance now begins with the 2-cent card rate. An elaborate table has been added giving the weights of sheets, both iron and steel, based on the Birmingham wire gauge. The following addition has been made to extras:

4. All sheets, No. 18 and lighter, 33 inches and wider, twenty (20) per cent. extra above common prices.

5. Heater to receive one-fourth above prices, and 3 cents per bundle extra, to be paid by the company, for all iron, No. 20 and lighter, annealed in an open furnace; shearmen, one-fifth, roller to receive above prices and pay heater, rougher, catcher and shearmen.

6. For all re-rolled iron or steel, No. 18 and heavier, rolled on three (3) high mills, thirty (30) per cent. above the regular scale price shall be paid.

7. All sheet iron or sheet steel shall be weighed by the company immediately after being sheared.

8. Twenty per cent. added for changed iron and steel.

11. For all iron or steel sheared two lengths, or two breadths, or over, out of one sheet, the company shall pay the shearmen ten (10) per cent. on above prices.

The following clause has been dropped from last year's scale: Iron made on a jobbing mill, No. 17 and heavier, shall be entitled to a 10 per cent. reduction over the wages of 1884-85, and where a full turn's work is made on No. 17 and heavier, then, in that case, it is a jobbing mill.

Sheet Mill Hands' Scale.

This scale is unchanged, but the following has been added:

1. On all lengths herein named, the following shall constitute a day's work, and part of a day in proportion, and the firm shall furnish one extra man as a general helper:

Length.	Pairs.	Pairs.	Pairs.
Inches.	Single.	Double.	Iron.
120	106	106	106
132	105	96	96
144	150	87	87

2. The day hands shall be paid the same per centage extra as the roller on wide sheets, strong iron, and steel.

9. All sheet mills rolling 28 (old scale, 30) inches wide and over shall be classed as large double mills, and those rolling under 28 inches wide shall be classed as small double mills.

The Pittsburgh scale of prices for roughing and catching on sheet and jobbing mills same as last year, except that the number of pairs per turn on single mills, Nos. 14 to 19, have been reduced from 120 to 105.

Rolling Pipe Iron on Sheet and Jobbing Mills.

Card rate.	Old price.	Proposed price.	Advance.
Cents.	Dollars.	Dollars.	Per cent.
2.0	3.10	3.40	9.7
2.1	3.12	3.42	9.5

Co., Salem, O. 7
Chambers, N. Y. 7
Perry, N. Y. 7
Pump Works, Indianapolis, Ind. 41
Reeling Presses. 26
Toledo, O. 26
Press Co., Middletown, Conn. 48
No. 204 E. 43d, N. Y. 48
Philadelphia, Pa. 9
Steel. 9
Mills, Allentown, Pa. 6
Rey, New York, N. Y. 41
Co., 32 Liberty, N. Y. 41
Pine, N. Y. 40
Broadway, N. Y. 40
Machine's Supplies. 13
ton, N. Y. 38
3 Chambers, N. Y. 38
Worcester, Mass. 10
Rochester, N. Y. 10
Philadelphia, Pa. 32
erson, 165 Greenwich, N. Y. 6
Kingston, Mass. 2
South, Mass. 2
Co., Pittsburgh, Pa. 46
Machine Co., Ansonia, Conn. 45
essor Works, Brooklyn, N. Y. 48
hinery. 4
Co., Pittsburgh, Pa. 37
ro, Mass. 38
Co., Pittsburgh, Pa. 38
achines. 47
ndira, N. Y. 43
l Co., 29 Chambers, N. Y. 9
Philadelphia. 42
ford, Conn. 37
hains. 12
abeth, N. Y. 12
Co., Bridgeport, Conn. 45
Haven, Conn. 34
o, Reading, Pa. 42
ge Co., Cohoes, N. Y. 37
d Pine, N. Y. 37
Chambers, N. Y. 37
e Place, N. Y. 38
dianapolis, Ind. 34
Clemson Mfg. Co., N. Y. 44
falo, N. Y. 34
e, 46-50 Cliff, N. Y. 9
h, Philadelphia, Pa. 13
hinery. 48
g. Co., Greenfield, Mass. 48
Plantville, Conn. 10
Co., 77 Chambers, N. Y. 26
ingham, Conn. 9
awtucket, Conn. 45
Philadelphia. 9
Co., Seneca Falls, N. Y. 38
Whetstones. 48
Co., Detroit and Chicago, Ill. 38
Station, N. H. 38
lephia, Pa. 47
West, N. Y. 4
N. Y. 9
rport, Conn. 12
Conn. 10
Co., 84 Chambers, N. Y. 10
New Haven, Conn. 10
ry Co., 84 Chambers, N. Y. 10
Sceps. 15
Pittsburgh, Pa. 15
place. 32
Co., Wallingford, Conn. 38
town, Conn. 7
Co., Columbus, 43
uside, N. Y. 48
port, Phila. 4
16 & 25 Ann, N. Y. 48
Co., 20
Co., 20
Co., 20
Fulton, N. Y. 15
herty, N. Y. 3
chester, Mass. 3
epeler, Vt. 13
Co., N. Y. 40
umbers, N. Y. 7
ool Co., Buffalo, N. Y. 44
Makers of Philadelphia, Pa. 46
umbia, N. Y. 46
Manufacturers, Cincinnati, O. 46
Co., Norwalk, Conn. 6
N. Y. 6
Co. 14
aphabets. 9
Co., 1
ork & Boston. 41
ffield, Eng. 40
Co., Mass. 41
st, N. Y. 4
ay, Boston, Mass. 44
ly. 4
ohn, N. Y. 41
Co., 41
klyn, E. D. N. Y. 45
Philadelphia. 6
out of Cambria, Mass. 9
ield, Eng. 9
R. Phila. 37
Pittsburgh. 40
Co., Pa. 40
ugh, Pa. 40
Philadelphia, Pa. 44
Co., 44
roy, N. Y. 40
N. Y. 40
N. Y. 40
Wrighters. 39
Bailey Wrighter Machine Co., Woonsocket, R. I. 39
Tramway Co., N. Y. 39
Hazard Mfg. Co., Wilkesbarre, Pa. 2
A. Lesches & Sons Rope Co., St. Louis, Mo. 2
Upson, Walton & Co., Cleveland, O. 2
Washburn & Moen Mfg. Co., Worcester, Mass. 2
Wood Engravers and Electrotypers, Engford, N. Hartford, Conn. 19
Woodenware. 4
Uckel Woodenware Works, Indianapolis, Ind. 41
Tucker Dugger Mfg. Co., Ind. 34
Wrenches, Manufacturers of, Benoit & Co., Bridgeport & Tool Co., Springfield, Mass. 7
Co. A. & Co., Worcester, Mass. 7
Co. L. & Co., Worcester, Mass. 30
Diamond Wrench Co., Ford, Mass. 30
Marble, Geo. W., Chicago, Ill. 7
Tower & Lyon, 85 Chambers, N. Y. 13
Williams, J. & B., Brooklyn, N. Y. 41
Wringers. 39
Bailey Wrighter Machine Co., Woonsocket, R. I. 39
Tramway Co., N. Y. 39
Hazard Mfg. Co., Wilkesbarre, Pa. 2
A. Lesches & Sons Rope Co., St. Louis, Mo. 2
Upson, Walton & Co., Cleveland, O. 2
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Tramway Co., N. Y. 39
Hazard Mfg. Co., Wilkesbarre, Pa. 2
A. Lesches & Sons Rope Co., St. Louis, Mo. 2
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Marble, Geo. W., Chicago, Ill. 7
Tower & Lyon, 85 Chambers, N. Y. 13
Williams, J. & B., Brooklyn, N. Y. 41
Wringers. 39
Bailey Wrighter Machine Co., Woonsocket, R. I. 39
Tramway Co

The Radcliffe Steel Melting Furnace.

(Continued from page 1.)

shells. These shells weigh from 250 to 1500 pounds each, and the metal is cast in dry sand molds. This furnace has since been in constant operation, and has given every satisfaction to the department. The above furnaces worked so well that a 10-ton furnace was built and commenced work on the 18th of June, 1886, and for the first week ending June 26, 1886, the result was as follows:

Weight of metals charged.....	T. C. Q.
Yield of ingots.....	101 10 0
Weight of skulls and scrap.....	1 18 2
Weight of fuel (being equal to 6.94 cwt. per ton of ingots).....	20 5 0

Since this date the furnace has been regularly at work, turning out about 100 tons of ingots per week, with a coal consumption on an average for the entire period of 6.3 cwt. per ton of ingots produced, 5.2 cwt. being the smallest and 7 cwt. the largest consumption of coal during any one week. The average loss of metal for the above time, deducting the weight of scrap recovered, has been 4.1 per cent. The fuel herein given includes what is burnt between Saturdays and Mondays, and also during the holidays, to keep the furnace going, and the fuel and other materials of the charges are all weighed by the store department, the latter being quite independent of the forge branch. It is found also that in the improved 10-ton furnace no more coal is consumed than in the smaller 6-ton furnace, and still better results are expected in further economy of fuel when the larger furnace of 20 tons capacity, which is now being erected, is completed. Referring to the small amount of scrap from these furnaces, this is due to the fact that all the steel for the heavy hammers is poured from the top and run directly into large ingots. The small amount of total loss is largely due to the non-oxidizing flame before alluded to. The stock used in the 6 and 10 ton furnaces is the purest pig iron, mixed with puddled blooms and hammer scrap, when such is available.

MANUFACTURING.

Iron and Steel.

The Bellefonte Iron and Nail Company, Limited, of Bellefonte, Pa., recently shipped 1000 kegs of nails to Portland, Oregon, via steamer, and have also shipped 1000 kegs to Valparaiso, Chili. They have orders on hand for 1000 kegs for shipment to Mexico and 5000 kegs for shipment to Cuba.

Mr. Alex. Laughlin, formerly secretary of the Junction Iron Company, of Wheeling, W. Va., has severed his connection with that company and has been admitted as a partner into the business formerly conducted by M. V. Smith, the well-known metallurgical engineer, of Pittsburgh. The new firm will be known as Smith & Laughlin.

The Pittsburgh Rustless Iron Works, having purchased the right to use the Bower-Buff patents in Allegheny County, Pa., is now erecting a furnace at Thirty-second and Smallman streets, Pittsburgh.

Furnace No. 4 of the Thomas Iron Works, at Hokendauqua, Pa., has been blown out for repairs, which will be commenced at once.

We take the following item from the Cleveland (Ohio) Trade Review of the 18th inst.: If the capitalists of Cleveland come promptly forward with reasonable inducements they can secure within the next 30 or 60 days the location in this city of a tool factory, an establishment for the manufacture of paper box machinery, and a mill for the production of American Russia iron.

The Works of the Pittsburgh Tube Company, at Pittsburgh, which have been idle several weeks for the purpose of making repairs, started up on single turn on the 20th inst.

The Joseph Bell Stove Company have been chartered at Wheeling, W. Va., with a capital stock of \$250,000, to succeed the firm of Joseph Bell & Co. The incorporators are Joseph Bell, D. Walker Bell, David Bell and C. J. Rawlings, of Wheeling, and Charles T. Coal, of Chicago. The intention of the new company is to enlarge the old works at the corner of Fourth and Main streets by the addition of new and substantial buildings. This increase of capacity will give steady employment to 150 men, whereas at present only 70 men can be employed when the works are running in full. Another plan of the company is the addition of a nickel plate department.

The Fulton Furnace, at Jackson, Ohio, belonging to the Globe Iron Company, was damaged by fire to the extent of \$10,000.

The Secretary of State of Ohio has incorporated the McArthur Gilmore Foundry Company, of Cleveland, with a capital stock of \$10,000. The incorporators are Robert Gilmore, M. J. McArthur, F. H. Goff, W. F. Carr and J. H. McArthur.

Stephen Neumoyer, superintendent of the Allentown Iron Company, at Allentown, Pa., has resigned his position, to take effect on July 1 next.

J. J. Crowther, who has been manager of the furnaces at Orbisonia, Pa., has accepted the position of manager of the Ashland Coal and Iron Company, at Ashland, Ky.

The Comstock Castle Stove Company, Quincy, Ill., have bought the large stove foundry plant of Duffy, Trowbridge & Co., which is located just a few feet south of the Comstock-Castle plant. It will be run in connection with the Comstock-Castle foundry—the whole being run as one concern. It enlarges the capacity of the Comstock-Castle Stove Company about 50 per cent.

The Missouri Malleable Iron Company, St. Louis, are fully two months behind their orders. The foundations for their new foundry addition are now laid, and the building will probably be ready for occupancy by July 1.

The Colorado Coal and Iron Company's No. 2 blast furnace, at Pueblo, Col., will be ready to cast pig iron about July 1. The work is progressing rapidly, the only delay

being caused by the slow arrival of machinery from the East. The capacity of the new furnace will be about 20 per cent. greater than the No. 1, but otherwise the two will be counterparts.

The Etaa Iron Works, of Cincinnati, Ohio, on the 1st inst. closed a contract for the purchase of the Sarah Furnace, located at Iron-ton, Lawrence Co., Ohio, and of which they will take possession July 1, 1887. The Sarah Furnace will be operated by them in connection with the Alice and Blanche Hot Blast Coke and Vesuvius Cold Blast Charcoal Furnaces. The plant consists of one stack 60 x 14, built in 1877, and was first blown in March 18, 1878, remodeled in 1886, supplied with the Whitwell hot blast stoves using Virginia and Connellsville coke and raw coal for fuel. The ore is native limonite.

by fire April 10, finally on June 9 succeeded in effecting a settlement with the insurance companies. Mr. John L. Pfau, the assistant general manager, seeing no immediate probabilities of the resumption of business, resigned his connection with the company and returned to Cincinnati.

The Bouton Foundry Company, of Chicago, are so pressed with work that they have been compelled to rent two extra foundries in order to keep pace with their orders. These foundries add about 25 to 30 tons a day to the capacity of the company, so that they are now melting about 80 tons of metal a day.

The Clinton Iron Works, Bingham & Taylor, whose iron foundry is located on Church street, near Genesee, Buffalo, have

Meanwhile, there will be no delay in filling orders, as the company have other facilities in this line which can now be brought into requisition.

The Prospect Machine and Engine Company, of Cleveland, have made an assignment. The capital stock of the corporation is \$400,000, and is held by leading citizens in Cleveland. The liabilities are estimated at \$200,000, and the assets \$500,000.

Sebastian May & Co., of Cincinnati, Ohio, have just completed the erection of a new four-story and basement brick structure on the lot at the southeast corner of Plum and Second streets, measuring 50 x 65 feet, a half square west of their former site. The building is a substantial structure, and admirably adapted to the purpose for which it was built—manufacturing machinists' lathes. The basement will be used for boiler and engine room and storage purposes, while the remaining floors will be used for manufacturing and storage of finished lathes. The offices of the company being located upon the second floor, the firm will have double their former capacity. They will confine themselves as heretofore to the manufacture of lathes only, of which four sizes are produced, 8 inch, 12-inch, 14-inch and 17-inch swing, the latter being their latest production.

The Williams & Orton Mfg. Company, of Sterling, Ill., in manufacturing the Charter gas engine, also provide for the manufacture of gas from gasoline for the use of the engine, so that the machine can be used anywhere for any purpose. The company expect soon to enlarge their works, the demand for engines making such enlargement necessary.

The Brooks Locomotive Works, at Dunkirk, N. Y., have issued a circular dated June 9, 1887, in which they say: "In officially announcing the death of Mr. H. G. Brooks, the founder of the Brooks Locomotive Works, which occurred on April 20, 1887, we beg to announce the following as the present list of officers: Edward Nichols, president; M. L. Hinman, vice-president and treasurer; T. M. Hequembourg, secretary; J. H. Setchel, superintendent; R. J. Gross, agent."

Of the new works of the Pond Machine Tool Company, at Plainsfield, N. J., a correspondent sends us the following additional particulars: The buildings will be equipped with four 10-ton and two 25-ton Morgan traveling cranes, and other modern improvements. L. H. Gager of the Flynt Building and Construction Company of Palmer, Mass., have drawn the plans, and the Flynt Building and Construction Company have taken the contract to build the complete plant, and will push the work at once. The Jersey Central Railroad will build a branch to run through the shops.

Hardware.

The Illinois Wire Company, incorporated some days ago, expect to effect a lease for their proposed works on railroad land lying between the Baltimore and Ohio and the Vandalia tracks in East St. Louis. The gentlemen interested in the new company

report orders for goods from the Sandwich Islands, England, New Zealand and different parts of this country.

Miscellaneous.

The Hostetter Coke Company, of Pittsburgh, who purchased 3500 acres of coal lands near Mt. Pleasant last month, will apply for a charter on July 2. The charter members of the company are: Jesse H. Lippincott, Thomas H. Given, W. W. Patrick, Charles B. McLean, F. L. Stephenson and Arthur Whitelaw. The capital stock of the company is \$1,200,000, of which \$200,000 will be expended this summer in developing the property. As soon as the company secure their charter work will be begun sinking a coal shaft and building coke ovens. It is the present intention to build 1000 ovens on the plant, 400 of which will be completed this year and the balance within 18 months. The capacity of the plant, when completed, will be 2000 tons of coke per day. The property is on the Southwest branch of the Pennsylvania Railroad, and the company have 100 acres of surface land on the railroad near Mt. Pleasant, where the first ovens will be built.

The stockholders of the National Car Company held their annual meeting at St. Albans, Vermont, and the following directors were chosen: James R. Langdon, Jos. D. Hatch, M. Hall Stanton, Gilman Cheney, Herbert Brainerd, E. Curtis Smith, Henry L. Millis.

The annual meeting of the stockholders of the Minnesota Thresher Mfg. Company, who were formed for the purpose of reorganizing the Northwestern Mfg. and Car Company, was held at St. Paul, on the 15th inst. They are a very important corporation, numbering among their stockholders capitalists of Boston, New York, Philadelphia, Chicago and other outside points. It is the purpose of the Minnesota Thresher Mfg. Company to petition the court for an order of sale of the plant and franchises of the Northwestern Mfg. and Car Company and to purchase them.

The shipments of iron ore from the mines of Lake Superior for the season, up to the date of closing the shipping reports for the week ending June 15, had reached an aggregate of 712,599 gross tons. At the corresponding date last year there had been 627,468 tons sent forward by lake, the gain for the current season being only 85,131 tons.

A dispatch from Cleveland, Ohio, under date of the 18th inst., says: After spending thousands of dollars to secure natural gas, Cleveland admits the valuable fuel cannot be found near the city, and to pipe it would be unprofitable.

Among the corporations recently organized to do business in Illinois are the following: The Standard Natural Gas Burner Company, at Chicago, for the manufacture of gas burners; capital, \$75,000; incorporators, Richard P. Burhans, James R. L. Smith and Frederick P. Bass. The Mason Car-Coupler Company, at Joliet, to manufacture car couplers, draw bars, &c.; capital, \$200,000; incorporators, Truman A. Mason, William E. Caton and Lester Soule. The Chicago Brass Hardware Company, to carry on a hardware business; incorporators, Frank S. Terry, Don C. Peck and Robert P. Bates. The Nickel-Plate Stove Polish Company, at Chicago, to manufacture stove polish, &c.; capital, \$10,000; incorporators, Edward P. Rogers, George F. Wetherell and Josiah M. Trusdell.

The Circular of the Interstate Commissioners.

The recent manifesto of the Interstate Commerce Commissioners, although nominally a reply to the petition of the Louisville and Nashville Railroad, is really a definition of their position upon the vexed short haul question. We give below the part of their decision containing this opinion, which our readers will notice is substantially in accord with the views advanced in our columns.

Section 5.—That the existence of actual competition which is of controlling force in respect to traffic important in amount, may make out the dissimilar circumstances and conditions entitling the carrier to charge less for the longer than for the shorter haul over the same line in the same direction, the shorter being included in the longer in the following cases: 1. When the competition is with carriers by water which are not subject to the provisions of the statute; (2) when the competition is with foreign or other railroads which are not subject to the provisions of the statute; (3) in rare and peculiar cases of competition between railroads which are subject to the statute when a strict application of the general rule of the statute would be destructive of competition.

Sec. 6.—The commission further decides that when a greater charge in the aggregate is made for the transportation of passengers or the like kind of property for a shorter than for a longer distance over the same line in the same direction, the shorter being included in the longer distance, it is not sufficient justification therefore that the traffic which is subjected to such greater charge is way or local traffic, and that which is given the more favorable rates is not. Nor is it sufficient justification for such great charge that the short haul traffic is more expensive to the carrier, unless when circumstances are such as to make it exceptionally expensive or the long haul traffic exceptionally inexpensive, the difference being extraordinary and susceptible of definite proof. Nor that the lesser charge on the longer haul has for its motive the encouragement of manufacturers or some other branch of industry. Nor that it is designed to build up business or trade centers. Not that the lesser charge on the longer haul is merely a continuation of the favorable rates under which trade centers or industrial establishments have been built up. The fact that long haul traffic will only bear certain rates is no reason for carrying it for less than the cost at the expense of other traffic.

The first street railway in America was completed in New York city in 1832.

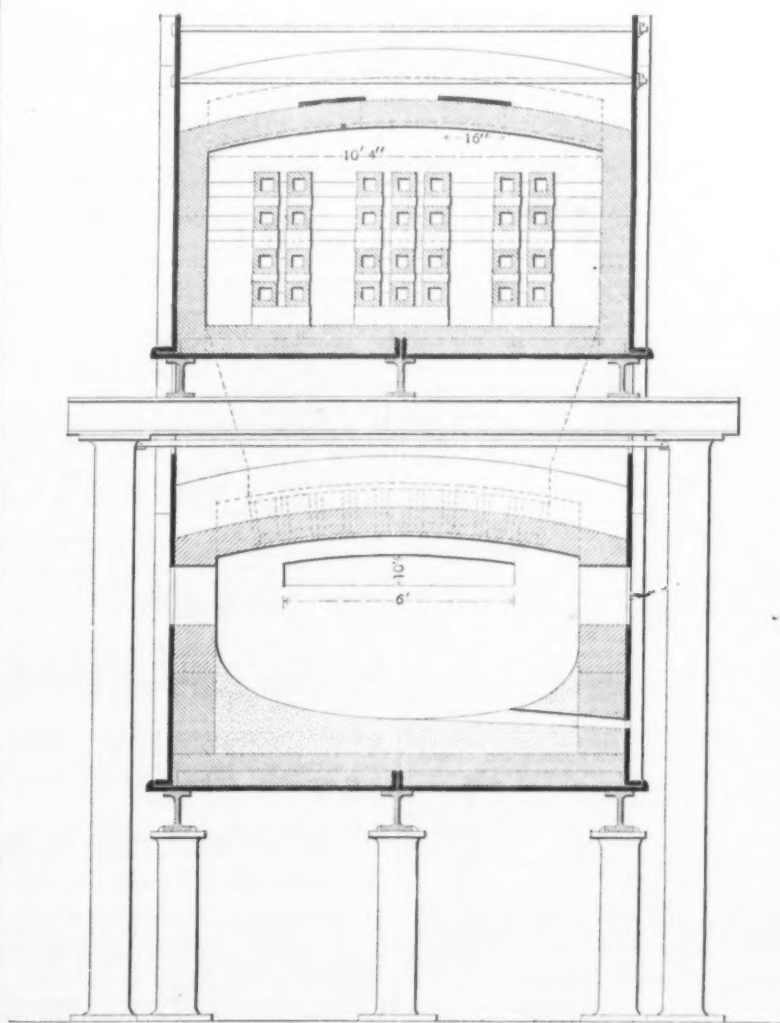


Fig. 3.—Cross-Section through H G, Fig. 1.

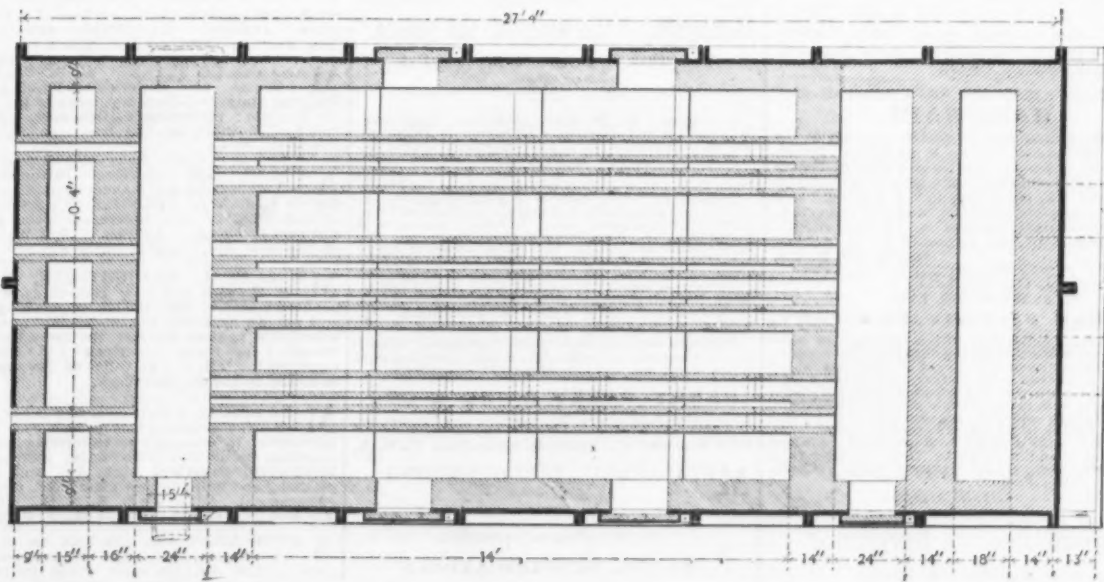


Fig. 4.—Section through C D, Fig. 1.

THE RADCLIFFE STEEL-MELTING FURNACE.

The product is No. 1 Foundry; annual capacity being 12,000 tons net. The officers of the company are A. Plumer, president; J. William Johnson, secretary; Sam. B. Richards, treasurer. The selling agents will be Messrs. Hosford & Fischer, Cincinnati, for all territory east of the Mississippi River, and Messrs. J. J. McDowell & Co. west of that boundary.

The Chicago Car Wheel Company have resumed operations in a new location. The new works are situated on Wood street, Chicago, south of and adjoining the establishment of the Wells & French Company. They manufacture only car wheels, and have a capacity of 200 to 250 wheels per day. The works were put in operation early in May, and are now in complete running order, with plenty of business on the books. The foundry has been arranged after the most approved modern style, using machinery wherever possible, but the molding of the wheels is still done by hand. The liquid iron is furnished at the heads of the floors by machinery, which can be operated by a boy, and the molded wheels are taken from the other end by a steam trolley, working automatically, which conveys them to the finishing-room. No lifting or trucking is done by the molders. The office of the company is in the First National Bank Building. N. S. Bouton is president; C. B. Bouton, treasurer, and S. F. Bouton, secretary.

The Maumee Rolling Mill Company, Toledo, Ohio, whose works were destroyed

broken ground for larger works on Howard and Holts streets.

Machinery.

The Philadelphia and Reading Railroad Company have ordered the construction of 35 new locomotives at the Baldwin Works, Heretofore the engines were built in Reading, but the machine shops are overcrowded now with repair work. The new locomotives will be on the latest American standard. Ten are for passenger service and the rest for coal freight.

Capitalists in Chattanooga, Tenn., are making an effort to secure the William Anson Wood Mower and Reaper Works, of Youngstown, Ohio. An offer of eight acres of land has been made, as well as to erect the necessary buildings, not to cost less than \$150,000.

The Cleveland City Forge and Iron Company, of Cleveland, are fitting up a new machine shop 100 x 45 feet in size. They have put in two large slots, two large lathes, beside heavy planers, boring mills, tapping and drilling machines, horizontal borers and presses, &c. They are giving considerable attention to the forging of special car-shaped irons.

Some damage resulted from a fire at the establishment of Crane Brothers Mfg. Company, Chicago, on the 17th inst., but the results were not specially serious. The gray iron department of their malleable works was injured to some extent, but it will again be in running order in a couple of weeks.

are Messrs. Best & Speight, of the the Best & Speight Galvanizing Company, this city, and a Mr. Rayburne, connected some six or eight years ago with the Harrison Wire Works. The business to be carried on will be wire drawing, for which machinery was purchased at the late Harrison Wire Works sale, and galvanizing. From this it will be seen that the Best & Speight Galvanizing Company will not remove to Lawrence, Kas., as they had thought of doing some months ago.

The Standard Axle Mfg. Co., with which T. W. Phinney, until recently with the Norway Tack Co., is connected, who are successors to Ralph R. Spears, Standard Axle Works, Wheeling, W. Va., announce that they have added to their works new and improved machinery for the manufacture of all sizes and styles of axles, which they warrant to be strictly first class. Natural gas is used throughout the works. The company state that they manufacture by a new process in the forge department their own billets, both iron and steel, made from the best selected scrap, whereby they are enabled to turn out the grade of steel and iron required for fine axles. They will keep a full and complete stock on hand to meet the wants of the trade.

The Bed Rock Emery and Novelty Works, Bainbridge, New York, are increasing their facilities for manufacture, and expect when their new novelty building is constructed that they will be in a position to meet all demands that are made upon them. They

Special Notices.

BUSINESS OPPORTUNITIES.

IN ORDER to give exclusive attention to and extend its manufacturing facilities for which its present location does not give required room, a company long established and admirably located in a Western city, at present engaged in Manufacturing and Jobbing Plumbers, Gas Fitters, and Steam Fitters' Supplies, will dispose of at favorable figures its leasehold and stock of goods and material held as dealers or jobbers of such goods, with all unfilled or accepted orders for same, existing at date of disposal. Provision for the latter, if of such material as this company proposes to manufacture, can be made at prices and on terms satisfactory to the purchaser if so desired. A continuance of the business without interruption and disappointment to the trade being this company's wish. Purchasers can take immediate possession of a paying business, with a trade secured. Business established 23 years; size of building, 44 x 110 inside; five floors with light on three sides; every floor available for use; entire building warmed by steam; offices large, convenient and well lighted; large brick vaults on ground, second and third floors, and entire building lighted by electricity and gas. Such permanent fixtures as Boilers, Engine, Heating and Lighting Apparatus, Power Elevators, etc., or any part of same, will be included in sale if desired. Present trade chiefly in New York, Pennsylvania, Ohio, Indiana, Michigan and Canada, with large retail trade in the immediate vicinity. Satisfactory terms of payment with reliable purchasers, and information of past and present business needed for its continuance fully and freely given. Address, in person or by letter, **WORSWICK MFG. CO.**, Cleveland, Ohio.

April 2, 1887.

ATTENTION,

Capitalist - and - Foundryman.

An Incorporated Company offers for sale State Rights to manufacture, and sell a valuable Patent Boiler (for house-heating). Hundreds in successful operation, which can be referred to for full particulars.

Address Box 1006,

WORCESTER, MASS.

New England States reserved.

National Storage Co.

PAID UP CAPITAL \$100,000.

This company is prepared to issue Warehouse Certificates on manufactured product and raw material, such as iron, lead, coal, lumber, wool, hides, iron, corn, tobacco, pork, dry goods, groceries, machinery, etc., or any class of personal property.

Stored on the Owner's Premises
IN CHICAGO, OR ELSEWHERE.

DIRECTORS:

L. J. Gage, C. R. Cummings, D. R. Dewey, E. G. Keith, C. L. Hutchinson, J. R. Walsh, W. H. Hammond, J. P. Odell, Chas. H. Moore, R. H. Lewis, G. S. White.
Refer to any of the Banks of Chicago.
CHICAGO ILL. OFFICE. - 54 Montauk Block.
W. G. STEPHENS, Secretary and Manager.
Correspondence solicited.

FOR SALE.

THE MACHINE SHOP AND FOUNDRY

with six acres of land, now occupied by THE STILES & PARKER PRESS CO., situated in the city of Middletown, on the Connecticut Valley Railroad. This is the only Jobbing Machine Shop and Foundry on the Connecticut, between Hartford and the Sound, and has the patronage of most of the surrounding towns; possessing good facilities for freightage by the Connecticut River and three railroads. Proposing to remove our business from the city, we will sell this property at a reasonable price, and part payment may be made in cashings. Possession given about October 1st. Apply on the premises, or by letter to

N. C. STILES, Treasurer.

CAPITALISTS, ATTENTION!

Wanted, Parties with from \$25,000 to \$50,000, to take an interest in a

LIGHT MANUFACTURING BUSINESS;

just the thing for the Natural Gas Regions. Address "BUSINESS," Box N.

Office of The Iron Age, 66 and 68 Duane St., N. Y.

A SMALL MANUFACTURING BUSINESS. over twenty years established, in full operation, for sale on account of the death of the proprietor. Goods well introduced and sold to the wholesale trade throughout the country. Cash in ten days. Business can be largely increased by right man. Apply on premises, after 2 p. m., 31 and 33 Furman St., near Fulton Ferry, Brooklyn, N. Y.

FOR SALE. - Stock of Iron, Steel, Wagon and Carriage material, both iron and wood; also, large, convenient Store Room, located in growing manufacturing and now booming city of Quincy, Ill., the second city in the state, population about 40,000; quite a railroad centre, and on the great Mississippi River. Excellent traveling territory on every side; for fine rich country scarcely equalled. Business established twenty years. Money made every year. The only store of the kind in the city. Reason for retiring, bad health.

LENLEY BROTHERS,

Quincy, Illinois.

FOR SALE, to close an estate,

A HARDWARE STOCK

of \$15,000 in the best business city in Michigan. Business established twenty-five years. Address "HARDWARE STOCK," Office of The Iron Age, 66 and 68 Duane St., New York

FOR SALE.

A GOOD CLEAN HARDWARE STOCK.

In a town of four thousand inhabitants in Southern Dakota; annual sales \$15,000. This is a rare chance and will bear investigation. Cause of selling, death in family. Address "LOCK BOX 173," Mitchell, Dak.

TO MANUFACTURERS WHO WISH THEIR GOODS PUSHED in this market and in other jobbing points of the North and West. The undersigned will accept the agency for the sale in this territory of a limited line of manufactures, suited to the Hardware or kindred trades, or to large consumers.

J. B. JOHN TON,

3736 Ellis Ave., Chicago, Ill.

For last seven years, buyer for Edwin Hunt's Sons,

Alabama's Mineral Belt.

Parties wishing information about, or investment in, Alabama Mineral, Lumber or Agricultural lands, will please address, with stamp,

EDWARDS & ARNOLD,

Talladega, Ala.

Special Notices.

BUSINESS OPPORTUNITIES.

FOR SALE.

THE MELVIN SEWING MACHINE CO.'S FACTORY AND GROUNDS.

located in Chillicothe, Ross Co., Ohio, and adjoining the depot grounds of the C. W. & B. and Scioto Valley Railroads. The main building is of brick, 138 x 83 feet; three stories, slate roof, well-lighted and floors 6 in. thick. The Engine, Boiler and Japan rooms and Blacksmith shop are all of brick and covered with tin. The whole building heated by steam and lighted by electricity. It contains a 45 horse-power Reynolds-Corliss Engine, a 75 horse-power Babcock & Wilcox Boiler and Edison Dynamo, all in good condition. One house and lot and three vacant lots, all adjoining the factory grounds. This is a desirable property for manufacturing purposes, and will be sold at a bargain. For further particulars call on or address

NELSON PURDUM, Receiver,

Chillicothe, Ohio.

FORT SCOTT, KANSAS.

Attention of Capitalists and Manufacturers is called to the numerous advantages existing at Fort Scott, Kansas, which will soon make this city one of the most important manufacturing and commercial points in the West, and enable it to maintain its present supremacy over all other cities in this State. The natural facilities are unequalled. Coal of the best quality is sold at \$1.50 to \$2.00 per ton; slack, 50 cents to \$1 per ton. Abundance of stone and brick, best quality. Natural gas is fully developed and used for all purposes. Facilities for transportation and distribution are unequalled, being already the junction of five trunk railways. Direct communication with lumber regions of Missouri and Arkansas. Correspondence solicited.

SECRETARY BOARD OF TRADE.

FOR SALE OR TO LEASE.

at Perth Amboy, New Jersey, adjoining wharves of the Lehigh Valley R. R. 30 feet of water, admitting largest ocean steamships without obstruction of any kind, 1800 feet dock front by 400 feet in depth. This property is crossed by the Lehigh Valley Railroad, the Pennsylvania Railroad and the N. J. Central Railroad, and, besides being one of the finest Harbors on the Coast, is also on the line of the Delaware and Raritan Canal Towing Line. Thirty feet of water in front of property, and three Railroads, Lehigh Valley, N. J. Central and Pennsylvania, all crossing the tract. See map on page 41. Address

WILLIAM T. MEREDITH,

No. 48 Wall St., New York.

VALUABLE IRON MINE FOR SALE.

This property covers an area of 300 acres and exhibits at various points an Ore giving 60 per cent. of iron-furnace best—no sulphur or phosphorus. The property is situated within 10 miles of Ottawa and is most favorably placed for mining operations. The highest reports upon the property have been received from first-class experts. Title perfect. The new Canadian iron tariff makes this a most valuable property. Samples of the Ore and further particulars can be obtained by applying to the Manager—Ontario Bank, Ottawa, Canada.

FOR SALE, a large and well-sorted stock of HARDWARE.

A long-established and profitable business at the old hardware stand, No. 207 Main Street, Jamestown, N. Y. Advantageous lease of store extending to May 31, 1892. Business includes several valuable specialties. The entire business will be sold at a bargain. Complete inventory ready for inspection. For particulars, address A. FRANK JENKS, Administrator of the estate of D. C. Jenks, Jamestown, N. Y.

FOR SALE, OR TO LET,

A LARGE FACTORY PROPERTY.

covering 28 to 30 city lots, with a frontage on three streets; convenient for water or railroad transportation; extra inducements offered by the Long Island Railroad, including a switch directly into the works. The buildings are of brick, substantially built, three stories high, with plenty of light and air. The engine boiler, shafting and gas machine are all in perfect order and ready to start at a moment's notice. The location is healthy and plenty of help can be obtained from the surrounding country. Time, one hour from New York City. Full description, with diagram, furnished on application.

J. C. MILLIGAN,

19 Cliff Street, New York.

FOUNDRY AND MACHINE SHOP

FOR SALE OR TO LEASE, near N. Y. Ten-ton Cupola, Crane, two Core Ovens, 2500 square feet moulding surface. Machine, Pattern and Carpenter Shop fully equipped. Address C. A. MILLER, 23 Maiden Lane, City.

WANTED TO SELL the leading HARDWARE BUSINESS of Denver, Col., located in the heart of the city; good fixtures and one of the best-equipped stores in Colorado. For further particulars, address No. 308 Jay St., Denver, Col.

Excellent Magnetic Iron Ore Tract,

Extending well for quantity and quality; neighboring large and successful working mine, and but three hours' ride distant; will be leased to faithful worker favorably.

CO-OPERATIVE,

P. O. Box 1879, New York.

HARDWARE BUSINESS WANTED

in exchange for **FLORIDA FARM PROPERTY**; beautiful lake front; good timber mill; location, healthy and accessible. Address

N. A. VURGAISON, Lake Como, Florida.

AGENTS WANTED.

In every manufacturing town to sell

DuPlaine's Plumbago Babbitt Metal.

Very liberal discount allowed and every inducement given you to make sales. Remember these are the Best Anti-Friction Metals made.

Address

E. A. C. DuPLAINE,

Chicago, Ill.

EUGENE BISSELL, Auctioneer.

HAYDOCK & BISSELL,

Successors to ROBERT R. HAYDOCK & CO., and E. BISSELL & CO. WHOLESALE

HARDWARE AUCTIONEERS,

19 Murray St. and 15 Park Place, N. Y. Sales held weekly for the trade. Consignments solicited. We refer to the leading manufacturers and importers.

Special Notices.

BUSINESS OPPORTUNITIES.

RECEIVER'S SALE

OF THE REAL ESTATE OF THE MAIDENCREEK IRON CO.

Of Blandon, Berks County, Pennsylvania.

Pursuant to an order of sale issued out of the Court of Common Pleas of Berks County, will be sold at public sale on Saturday, July 23, 1887, at 2.30 o'clock, P. M., at the public house of R. S. Unger, in the village of Blandon (a station on the East Pennsylvania Railroad, eight miles North-east of the City of Reading), Berks County, the following described real estate of the Maiden Creek Iron Company, viz:

No. 1. All those certain six two-story frame dwelling houses and lots of ground on which the same are erected, situate in the village of Blandon, Maiden Creek Township, County and State aforesaid; bounded on the North by a public road, East by other property, the Maiden Creek Iron Company, South by a ten-foot wide alley and West by property, late of Charles Levan, containing in front 120 feet and in depth 17 feet and 6 inches.

No. 2. All that certain messuage, tenement and tract of land situate in Rumschman Township, said County of Berks, bounded by lands of Samuel Barnett, Samuel Rissmiller and others containing 9 acres more or less. Also a tract of land adjoining the one just described, bounded by lands of Samuel Rissmiller, Henry Bernhart and others containing 1 acre and 138 perches. Also the undivided fourth part of a tract of land situate in the Township last above named, bounded by a public road, lands of Moses Rothermel and others, containing 23 acres and 20 perches. The tracts composing No. 2, being known as the "Sand Hole Tract."

No. 3. All that certain tract of land situate in Maiden Creek Township, said County of Berks, known as the "Wesner Tract," bounded by lands of Isaac Hagy, George Moyer and others, containing 35 acres and 53 perches. Also a messuage and tract of land containing a dwelling-house and other buildings, situate in the Township and County last above named, bounded by lands of Wm. Bickel, a public road and the East Pennsylvania Railroad, containing 35 acres more or less.

No. 4. All that certain messuage and tract of woodland situate in Rumschman Township, said County of Berks, known as the "Shaler Tract," bounded by lands of the late Wm. H. Clymer, deceased, Jeremiah De Turk and others containing 43 acres and 120 perches.

No. 5. All that certain Rolling Mill, Office and Blacksmith shop, situate in the village of Blandon, Maiden Creek Township, said County of Berks, bounded by the East Pennsylvania Railroad, property late of Benneville Schroeder, two public roads, property of late Charles Levan, deceased, lands of Jeremiah De Turk, Catharine Madeira, Saml. Hawkins and others, containing 11 acres and 12 perches more or less. The Mill building has a length of 223 1/2 feet and a width of 127 feet. It has 3 trains of rolls, one 18-inch muck train, one 12-inch finishing train, and one 8-inch guide and hoop train; it has a single puddling and 3 heating furnaces; the motive power consists of 3 engines, aggregating 35 horse power; it has a steam pump, large lathe and 2 pairs shears; belonging to it are 200 rolls of various kinds; its capacity is about 500 tons of iron per year. It is supplied with water from a dam, sufficiently elevated to obviate the necessity of pumping; convenient sidings extend from the railroad to the mill.

This property is located in the village of Blandon, on the East Pennsylvania Railroad, 120 miles from New York, 66 miles from Philadelphia and 8 miles from the City of Reading, a thriving manufacturing town, which at all times consumes a large portion of the product of the Mill. It is particularly adapted for the manufacture of all kinds of small merchant iron.

Terms of sale: ten (10) per cent. down on Nos. 1, 2, 3 and 4; and \$500.00 down on No. 5; balance to be paid within 60 days from confirmation of sale by the Court, when deeds will be delivered.

HIRAM Y. KAUFMAN, Receiver of the Maiden Creek Iron Co. June 20, 1887.

Aluminium, "the Metal of the Future."

The Only Treatise in the English Language.

Aluminium: Its History, Occurrence, Properties, Metallurgy and Applications, including its Alloys. By Joseph Richardson, C. Chemist and Practical Metallurgist. Member of the Deutsche Chemische Gesellschaft. Illustrated by 16 engravings. 12 mo., 346 pages. Price, \$2.50. Free of postage to any address in the World. Contents: Part I. History of Aluminium. II. Occurrence of Aluminium in Nature. III. Physical Properties of Aluminium. IV. Chemical Properties of Aluminium. V. Metallurgy of Aluminium. VI. Manufacture of Sodium. VII. Manufacture of Aluminium. VIII. Manufacture of Double Chloride of Aluminium. IX. Manufacture of Aluminium. X. Reduction of Aluminium by other Reducing Agents than Sodium. XI. Working of Aluminium. XII. Alloys of Aluminium. Appendix. Addenda. Index.

A circular showing the full table of contents of this volume will be sent free of postage, to any one in any part of the World who will furnish us with his address.

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DISSOLUTION NOTICE.

The Partnership between Herring & Sweasy, Hardware Commission Merchants, having expired by limitation, is this day dissolved. Mr. W. B. Sweasy will liquidate the affairs of the late firm, and sign for the same.

New York, June 15, 1887.

HERRING & SWEASY, 72 Reade St., New York.

Referring to the above, I respectfully solicit from my friends in the trade a continuance of their patronage for Mr. W. B. Sweasy, successor to the old firm.

New York, June 15, 1887. H. HERRING.

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is not intended for use in an oil cut. For gears for loose-fitting journals and bearings where such a grease can be used, complete satisfaction is guaranteed.

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A TRAVELING SALESMAN, having large trade in Cutlery, Guns and Hardware, South and West, is open for an engagement; best of references. "SOUTH," office of The Iron Age, 66 and 68 Duane Street, N. Y.

A CONSTRUCTING ENGINEER or SUPERINTENDENT of Bessemer or open-hearth steel works, by a man of large experience in above capacities. Address LOCK BOX 60, Pittsburgh, Pa.

AFTER JULY 1st by a SALESMAN with 8 years' experience of General Hardware (Warehousing) and 7 years' as traveler for lock manufacturer; satisfactory references. Address "K," The Iron Age, 66 and 68 Duane St., N. Y.

PLAST FURNACE FOUNDER who has been at the present Furnace for the past 10 years, desires to change; satisfactory credentials furnished. Address "B. J. W.," office of The Iron Age, 66 and 68 Duane St., N. Y.

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OLD BRASS,

OLD COPPER.

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4 5 x 6 Vertical Engines, New	\$75
1 5 x 8 "	125
1 6 x 8 "	140
1 6 x 8 "	140
1 7 x 8 "	155
1 8 x 9 "	165
1 8 x 10 "	180
1 24 x 4 " Boiler,	7
1 24 x 6 "	85
1 28 x 6 "	75
1 28 x 8 "	

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12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406, 408, 410, 412, 414, 416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438, 440, 442, 444, 446, 448, 450, 452, 454, 456, 458, 460, 462, 464, 466, 468, 470, 472, 474, 476, 478, 480, 482, 484, 486, 488, 490, 492, 494, 496, 498, 500, 502, 504, 506, 508, 510, 512, 514, 516, 518, 520, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, 546, 548, 550, 552, 554, 556, 558, 560, 562, 564, 566, 568, 570, 572, 574, 576, 578, 580, 582, 584, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654, 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 686, 688, 690, 692, 694, 696, 698, 700, 702, 704, 706, 708, 710, 712, 714, 716, 718, 720, 722, 724, 726, 728, 730, 732, 734, 736, 738, 740, 742, 744, 746, 748, 750, 752, 754, 756, 758, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 780, 782, 784, 786, 788, 790, 792, 794, 796, 798, 800, 802, 804, 806, 808, 810, 812, 814, 816, 818, 820, 822, 824, 826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000, 1002, 1004, 1006, 1008, 1010, 1012, 1014, 1016, 1018, 1020, 1022, 1024, 1026, 1028, 1030, 1032, 1034, 1036, 1038, 1040, 1042, 1044, 1046, 1048, 1050, 1052, 1054, 1056, 1058, 1060, 1062, 1064, 1066, 1068, 1070, 1072, 1074, 1076, 1078, 1080, 1082, 1084, 1086, 1088, 1090, 1092, 1094, 1096, 1098, 1100, 1102, 1104, 1106, 1108, 1110, 1112, 1114, 1116, 1118, 1120, 1122, 1124, 1126, 1128, 1130, 1132, 1134, 1136, 1138, 1140, 1142, 1144, 1146, 1148, 1150, 1152, 1154, 1156, 1158, 1160, 1162, 1164, 1166, 1168, 1170, 1172, 1174, 1176, 1178, 1180, 1182, 1184, 1186, 1188, 1190, 1192, 1194, 1196, 1198, 1200, 1202, 1204, 1206, 1208, 1210, 1212, 1214, 1216, 1218, 1220, 1222, 1224, 1226, 1228, 1230, 1232, 1234, 1236, 1238, 1240, 1242, 1244, 1246, 1248, 1250, 1252, 1254, 1256, 1258, 1260, 1262, 1264, 1266, 1268, 1270, 1272, 1274, 1276, 1278, 1280, 1282, 1284, 1286, 1288, 1290, 1292, 1294, 1296, 1298, 1300, 1302, 1304, 1306, 1308, 1310, 1312, 1314, 1316, 1318, 1320, 1322, 1324, 1326, 1328, 1330, 1332, 1334, 1336, 1338, 1340, 1342, 1344, 1346, 1348, 1350, 1352, 1354, 1356, 1358, 1360, 1362, 1364, 1366, 1368, 1370, 1372, 1374, 1376, 1

Trade Report.

70%, the lowest prices ever known in this market. Coffee was strong on better quotations from Havre, but afterward weakened. Referring to the recent cyclone in Chicago, where there are more than 16,000,000 bushels of wheat to be disposed of at a reduction, the Chicago Tribune counts up nearly a score of stranded firms, with total losses running up far into the tens of millions of dollars as among "the visible remains of the terrible strife," and fears that there is a loss of confidence well nigh as deplorable as the loss of cash from which recovery may be slow.

In the general markets the turn is more favorable. Larger exports, brilliant crop prospects, satisfactory railroad earnings, and a decision by the Interstate Commissioners showing a disposition to construe the law liberally, but with due regard for all interests, these are influences not without their effect. Touching the "long and short haul," it is argued that the commission's action puts the roads, for the moment, in the same position that they were before the law was passed, inasmuch as it gives them discretion as to their acts. In the meantime traffic methods have been put on a basis partially or wholly in accordance with the law, and it will be an easy matter now for the companies to conform themselves to it.

The Stock Exchange markets have been generally strong, but weakened at the close as the extent of the disaster which has overtaken the Fidelity Bank, of Cincinnati, became more fully disclosed. Strength was derived from higher prices for Americans in London and a consequent reduction in exchange. On Friday Reading started upward, followed by Jersey Central, but transactions, as a whole, were light. On Saturday, it was reported that differences between Reading and Schuylkill Navigation, which threatened the plan for reorganization, would be amicably settled. On Monday, as on previous days, dullness was the leading feature, mainly due to apprehended stringency in money, in connection with July interest disbursements. On Tuesday the failure of the Fidelity Bank, and a further break in wheat in Chicago, caused a considerable selling of long stock and feverishness generally, but Reading became buoyant at the close and stimulated the whole list. To-day with few exceptions the tendency was downward, and railroad bonds were dull.

United States bonds closed as follows:

U. S. 4 1/2% 1891, coupon.....	109 3/4 @ 109 3/4
U. S. 4 1/2% 1897, coupon.....	120 3/4 @ 120 3/4
U. S. 4 1/2% 1895, coupon.....	121 1/4 @ 121 1/4
U. S. 4 1/2% 1896, coupon.....	121 3/4 @ 121 3/4
U. S. 4 1/2% 1897, coupon.....	121 3/4 @ 121 3/4
U. S. 4 1/2% 1898, coupon.....	121 3/4 @ 121 3/4
U. S. 4 1/2% 1899, coupon.....	121 3/4 @ 121 3/4

The bank return this week shows an increase of nearly \$200,000 in the surplus reserve, which now stands at \$4,116,625, while in loans there was an expansion of \$1,268,000. A gain, instead of a loss, of reserve, in face of the urgent demands for the West, was somewhat of a surprise. Money is fairly easy, although banks are more closely scrutinizing offerings for discount. Supplies of commercial paper are limited. We quote 60 @ 90 days first class, 5%; longer dates, 5 1/2 @ 6 1/2%. The Connecticut State treasurer has placed \$500,000 with the Aetna Insurance Company at 103.27 and \$500,000 with the Williamsburgh Savings Bank at 102.55. The operations of the United States Treasury as foreshadowed from Washington show that the interest payments on July 1 will be \$9,526,000, the pension payments \$12,000,000, making \$21,526,000. According to the Custom House report, the exports of specie from this port last week were \$187,926, and the imports \$180,000, making the totals since January 1, \$9,450,000 and \$5,850,000 respectively, as compared with \$36,426,000 and \$5,775,000 for the corresponding time in 1886.

The first consignment of the new crop wheat arrived on Monday from Virginia, and was of good quality. Henry B. Hebert & Co., brokers, sold it to the Jewell Milling Company, at \$1.25 a bushel.

The importations of merchandise at this port last week were about \$500,000 larger than during the previous week, the valuation being \$8,740,343, making the total since January 1 \$217,238,000, against \$200,619,000 for the same time last year, and \$180,642,000 in 1885. The exports are \$1,281,000 below those of the previous week, the valuation being \$5,572,962, making a total of \$139,714,000 since January 1, against \$141,839,000 for the same time last year, and \$159,893,000 in 1885. The items include 807,000 bushels of wheat, 4929 bales of cotton, and 12,615,000 gallons of petroleum. Freight engagements for wheat are heavy, extending well into July.

The amended law in regard to insolvent debtors in this State limits preferences to one-third of the assets, and takes effect to-day, June 22.

Under the new treaty with Mexico, for which ratifications were exchanged 20th inst., any articles mailed in the United States may be sent to any address in the Mexican Republic at the same rate that prevails in the United States, and can send goods to Mexico by mail at the rate of 1¢ per ounce or 16¢ per pound in packages not exceeding 4 pounds 6 ounces in weight, paying only the Federal duty.

General Hardware.

With the ending of the month and the half year, Hardwaremen are showing a disposition to limit purchase to their immediate requirements, and there is consequently a moderate volume of business. There is little change to be noted in prices.

NAILS.

The New York market is quiet, with a fair amount of business doing and a slightly better tone. Low prices are occasionally reported, but are not so frequent as in the past. We continue to quote \$2 and \$2.05 for carload lots, and \$2.10 to \$2.15 for Iron Nails from store.

BARB WIRE.

Eastern manufacturers have reduced their prices during the week, and they now quote for Four Point Galvanized Barb Wire 4.40¢ in small lots to dealers, 4.30¢ for three ton lots in one shipment, and 4.10¢ for carlots in one shipment.

MISCELLANEOUS PRICES.

Owing to a recent advance in the price of German Chains, the following new list, which went into effect June 20, is announced by Hermann Boker & Co., Alfred Field & Co., and Wiebach & Hilger of this city, the discounts being referred to as remaining without change:

4 1/2 Feet Hatter Chain.									
Nos.	4-0	3-0	2-0	1-0	0	1	2	3	4
Per doz.	\$6.00	5.50	4.50	4.00	3.50				
Nos.	2	3	4	5	6	7	8	9	10
Per doz.	\$3.70	2.75	2.05	2.55	2.45				

6 Feet Hatter Chain.									
Nos.	4-0	3-0	2-0	1-0	0	1	2	3	4
Per doz.	\$8.00	6.75	5.75	5.00	4.50				
Nos.	2	3	4	5	6	7	8	9	10
Per doz.	\$1.00	8.80	8.35	3.90	3.10				

Coil Chain—Twisted or Straight Links.									
Nos.	4-0	3-0	2-0	1-0	0	1	2	3	4
Per 100 feet.	\$13.50	11.00	10.00	7.75	6.75	6.00			
Nos.	1	2	3	4	5	6	7	8	9
Per 100 feet.	\$5.25	4.65	4.25	4.00	3.90	3.80			

The market for Cartridges continues without change, prices being maintained by the manufacturers, and with but the usual irregularities in the prices at which they are sold by some in the trade.

There is considerable divergence in the quotations, which are made by different manufacturers of Axles, these quotations being, however, in all cases somewhat higher than the prices which until recently have prevailed. The market is regarded as in a firm condition, and it is thought not unlikely that slight advances may be made by some of the manufacturers who are now quoting the lowest prices.

The withdrawal of quotations on Rubber Belting and Hose has become general, and the manufacturers are announcing prices ranging from 10 to 12 1/2 per cent. higher, this advance being most marked in the best goods. The condition of the market for Crude Rubber is the principal cause of this strengthening, the price of Cotton having also something to do with it.

There are no new developments in the market for Strap and T Hinges, the association prices being regularly maintained and not undersold, it is thought, by outside competition. Many of the jobbers are, however, shading the regular price slightly, discount 70 and 5 per cent. being often made in moderate lots to retailers.

Cast Butts are held by some of the manufacturers at the regular prices, it not being deemed necessary to meet the lower figures at which the goods may be purchased from others.

Wrought-Iron Pipe continues depressed and irregular, and lower quotations are made than at our last writing. In its present condition the market is largely in the buyer's favor, and some of the companies are not disposed to lose orders at any reasonable price. This condition of things is to be explained largely by the animated competition that exists among the manufacturers, some of whom have within a comparatively recent time entered the market, while others have largely increased their facilities for manufacture. The result is that there is a serious overproduction. The limited demand at this season has also its effect. How long this condition of things is to continue is a question upon which opinions differ. It is claimed by some that the present prices are so unremunerative that they cannot very long continue, and the probability of an advance in wages is referred to as likely in the near future to strengthen the market materially. Others think that the present prices will be maintained, without further decline or important advance, for some months to come.

The association of the manufacturers of Common Carriage Bolts met in this city last Thursday, and adopted some modifications in their discounts. The regular price was slightly advanced, being made discount 70 and 12 1/2 and 3 per cent. instead of 70 and 15 and 3 per cent., as heretofore. At the same time revised quantity discounts were determined upon, making the extreme price to be about the same as before. The present quantity discounts, or rebates, are as follows: On orders of \$500 worth in six months, a rebate of 5 per cent. is given, while purchases of \$1000 worth in six months are entitled to a rebate of 7 1/2 per cent., and purchases of \$2000 worth in six months, receive a rebate of 10 per cent. It is understood that this change of discount was made with a view to serving the interests of some of the large buyers, who alone will be able to buy the largest quantity named above. Some of the manufacturers have questioned the wisdom of the change, apprehending

that giving, as it does, a larger margin to the jobbers, there will be more opportunity and inducement afforded them to cut prices. It remains to be seen whether this change will result in giving the apprehended irregularity to the market.

Wrought-Iron goods are held by the manufacturers, as they have been for some time, with satisfactory firmness, and it is understood that efforts are being made to induce a slight advance. The negotiations, however, have not progressed sufficiently far to indicate more than a possibility of higher prices.

The manufacturers of Stocks and Dies, whose competition has been so animated for some time, have, it is understood, been conferring with a view to some united action. There is not as yet promise of anything immediate, but there appears to be an increased probability of an understanding by which prices may be more or less advanced.

The announcement on page 42, in which the Reading Lock Mfg. Company call attention to the special prices which they are offering on Sash Locks will be observed. The low prices quoted on these goods will be of interest.

The Leopold Saw-Set, of which a description is given on page 27, is manufactured by the American Mfg. Company, Philadelphia, and sold at \$15 per dozen, subject to a discount of 40 and 10 per cent. The tools are packed separately in paper boxes and 1 dozen in a case.

The Hiram Holt Company, East Wilton, Me., manufacturers of the well-known Lightning Hay Knife, are making efforts to prevent cutting on the part of the jobbers in the price of this article. The company advise us that they hold the goods strictly at 25 per cent. discount, except for specified quantities, when special discounts are given. The freedom with which many of the jobbing houses have been giving extra discounts has caused some irregularity in the prices of the goods, but these houses, as we understand it, intimate their intention of holding the goods regularly at discount 25 per cent.

The Bed Rock Emery and Novelty Works, Bainbridge, N. Y., issue a sheet giving illustrations of some of their manufactures, including a variety of Emery Grinding Machines and Novelties, of which descriptions are given. Some testimonials from parties familiar with the goods are also sent out. The company emphasize the point that their Bed Rock Wheels do not heat nor glaze, and do not require water any more than a File or a Saw does. They are intending to get these Machines generally into the hands of Hardware dealers, and allude to their utility, especially to farmers. The following is the price list of their Bed Rock Wheels, the discount on Wheels 1 inch thick and under being 40 per cent. and on Wheels over 1 inch thick 60 per cent:

Thickness of Wheels in Inches.									
	1/4	1/2	3/4	1	1 1/2	2	2 1/2	3	4
4	\$0.80	\$1.10	\$1.35	\$1.60	\$2.20	\$2.75	\$3.25	\$3.85	\$4.60
6	1.40	1.75	2.50	3.05	4.30	5.60	6.90	8.25	11.00
8	2.12	2.60	3.60	4.50	6.40	8.30	10.20	12.10	16.00
10		3.70	5.10	6.60	9.50	12.40	15.35	18.15	23.80
12		4.00	6.00	7.40	10.70	14.05	17.40	20.75	27.50
14		6.20	8.70	10.70	15.20	19.50	24.20	28.75	30.70
16			11.00	13.70	19.40	25.00	30.80	36.50	48.75
18			13.75	17.00	24.50	32.00	39.50	47.05	62.00
20				20.00	29.00	38.00	47.00	56.00	75.00
22					35.50	46.75	58.00	69.25	91.75
24					43.00	57.00	71.00	85.00	113.00
26						57.50	75.00	93.00	125.00
30							127.00	157.00	250.00

The American Oil Stove Company, Gardner, Mass., for whom the Alford & Berkele Company are agents, 77 Chambers street, New York, issue an interesting catalogue and price list of their various specialties. The goods illustrated and described include a number of attractive constructions, which embody novel features of convenience and utility. The American oil stove is shown in several sizes, with two and three burners, and engravings are introduced for the purpose of showing the stove dismounted. The American is made both for cooking and heating purposes, and permits the use of an oven, combining many desirable features. The Young America is an efficient construction of medium price which is rapidly growing in favor. These goods are provided with the company's improved tank filler, and a wick-raiser and burner which engages the wick its entire width at 26 different points on each side, being of positive action. The manner of securing the mica is such that it may be readily changed when desired. The company also admit light to the oven, employed by means of a window fitted with glass. The list prices are as follows, and are subject to a discount of 33 1/3 per cent:

Name and Number.	List Price.
Baby American.....	1.50
Baby American, Oven.....	1.00
Baby American Heating Stove.....	2.00
Baby American Radiator.....	1.00
No. 2, Baby American.....	2.50
No. 3, Baby American, Ex. Top.....	75
No. 2, Baby American, Oven.....	1.75
No. 3, Baby American Heating Stove.....	4.25
No. 2, Baby American Radiator.....	1.50
No. 4, American, Ex. Top.....	2.25
No. 4, American, Oven, dark.....	2.25
No. 4, American, Oven, light.....	2.75
No. 4, American Stand.....	1.50
Chemical American, complete.....	4.00
Young America.....	5.00
Young America, Ex. Top.....	1.25
Young America, Oven, dark.....	2.25
No. 6, Young America, Oven, light.....	2.75
Young America Heating Stove.....	5.50
Young America Radiator.....	3.00
No. 6, Young America with Top.....	12.00
No. 6, Young America, Oven, dark.....	3.00
No. 6, Young America, Oven, light.....	3.50
Wicks, per dozen.....	.50
Wicks, per gross.....	6.00
No. 2, American.....	6.00

No. 3, American.....	8.00
No. 2, American, Plain.....	12.00
No. 2, American, Brass and Nickel.....	14.00
Extension Top, No. 3, deep.....	2.50
Extension Top, No. 5, deep.....	3.00
Oven for Nos. 2, 3 and 5, dark.....	3.00
Oven for Nos. 2, 3 and 5, light.....	3.50
Radiator for Nos. 2, 3 or 5.....	4.00
Range Stand, No. 2 or 3.....	2.75
Range Stand, No. 5.....	3.00
Roller for all Stoves.....	1.00
Flat Heater for all Stoves.....	.75

The Bryan Mfg. Company, Bryan, Ohio, make the following quotations on the line of Wheelbarrows which they are manufacturing. It will be observed that it includes their late additions. The prices given are for Wheelbarrows with sawed felloe, wood hub, 16 x 1 1/4; the terms being 30 days, or 1 per cent. discount for cash in 10 days from date of invoice:

Railroad or Dirt Wheelbarrows.	Per dozen.
Champion King.....	\$13.50
Champion Junior.....	15.00
Champion Hardwood.....	17.00
New Bolted Leg Barrow.....	12.50
Flat Wheelbarrows, for Stores and Factories.	
Champion.....	\$30.00

Garden Wheelbarrows.	Per dozen.
Champion, medium size.....	\$28.00
Champion Idea.....	30.00

Brick Barrows.	Per dozen.
Champion.....	\$30.00

Hopper Wheelbarrows.	Per dozen.
Peck, Champion.....	\$24.00

Stone Barrows.	Per dozen.
Champion, with wood bed.....	\$30.00

For Wheelbarrows, with iron center, wood wheel, heavy sawed felloe, 18 x 1 1/4, tire, \$2 per dozen additional, and with iron wheel, wrought iron tire, arms and spindle, 16 x 1 1/4. No. 10 tire, \$2 per dozen additional. Their catalogue, which has recently been issued, illustrates, among other goods, their Champion King and Champion Idea, in the manufacture of which their patents, December 21, 1886, are applied. The feature which is new is the extension of the long brace, one end of which is attached to the foot of the leg, the brace extending forward to the end of the handles. This brace, in combination with the upright brace that supports the forward side of the box, is referred to as making a very substantial framework for the Barrow.

OBITUARY.

On the 8th of June, at Chicago, occurred the death of Jabez K. Botsford, formerly a prominent wholesale Hardware merchant of that city, and widely known, especially in the West. A friend furnishes the following tribute to his memory:

In the death of Jabez K. Botsford, Chicago has lost one of its oldest inhabitants and most enterprising citizens. Embarking in the Hardware business in 1832, he was the pioneer in that line. It will not come amiss, therefore, to speak to his many friends, and tell them through the medium of *The Iron Age* of this friend of humanity. Settling in Chicago at so early a day, he was of necessity compelled to endure many of the privations of the time, but he mastered all the difficulties, gradually increased his facilities

by a strict compliance with business principles, and gained friends, who remained so to the last, and the announcement of his death will be read with true sorrow by every one who had the pleasure of his acquaintance. By those who were associated with him in business in any capacity his loss will be sincerely felt, and especially so by those who were in his employment, because he treated them as equals rather than as servants. He always felt that the clerk or salesman in his employment would serve his interest better when well paid than otherwise, and he took special pride in personally looking after their interest. This was largely due to his knowledge of men, added to his own experience as an employee in the early days of his life, which he never forgot.

At the time of the great fire in 1871 the firm was composed of J. K. Botsford, John R. Botsford and B. B. Botsford, under the firm name of J. K. Botsford & Sons, and was at that time one of the leading wholesale houses in Chicago. The fire wiped out everything but Mr. Botsford's energy and his faith in Chicago's future. Through increasing years (he was at that time 60) he decided not to again embark in business, although this was due to some extent to the illness of John, the eldest of the two sons, who died a few years ago, after many years of bodily suffering. Mr. Botsford immediately proceeded to rebuild, however, seeing the necessity for store room to accommodate the burned-out merchants, and had the first store on Lake street ready for occupancy before others realized where they stood.

The writer does not believe that Mr. Botsford left a great fortune, but he does know that he left a good name and an example that will endure for all time. This abbreviated history of a remarkable man would not be complete without a reference to his life companion, whom he took to his heart at the age of twenty-three years, and who for more than half a century stood by his side and gave him advice and counsel, which he always sought with profit to himself and his undertakings. She was by natural gifts and education eminently qualified to fill so important a position, and her advanced ideas enabled her to deal intelligently with important matters as they presented themselves. Mr. Botsford was one of the founders of the Northwestern University

and one of its most generous contributors, as he also was to other objects of worthy charity, and of which very few were aware. He lived and died an honest man.

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ITEMS.

Hibbard, Spencer, Bartlett & Co., Chicago, Ill., issue, June 15, a 12-page price current, which relates to Tin Plate, &c., Binding Twine, Bicycles, King's Great Western Powder Company's Powder, Scythes, Barbed Wire, and a number of seasonable articles. They also allude, in a separate sheet, to Argate Iron Ware. The company are also sending out sheets giving the list for Carriage and Tire Bolts and Screws, with the net prices calculated at different discounts. The discounts at which the prices of Carriage Bolts are calculated, are 50, 40, 30 and 20 per cent., Tire Bolts being figured at discounts 40, 30, 20 and 10 per cent., and Screws at discounts 60, 50, 40 and 30 per cent. These sheets of prices are intended to be enclosed in a sheet of 10 x 14 Tin, with or without glass front, after trimming the blank margin.

The catalogue of the United States Supply Company, 51 John street, New York, illustrates a line of mill and factory supplies, Automatic Sprinklers and Fire Extinguishing Appliances, which is of interest as bringing together a large variety of machines and articles belonging to this line.

The Wire Goods Company, Worcester, Mass., issue extra pages for their catalogue describing some of their recent additions. They relate to the Elastic Steel Door Mat, which is described on page 2, new patterns of Brass Wardrobe Hooks, and a line of Improved Wrought Staples, the special features of which are that the arms are the same size all the way down, and the points true, so that they drive with accuracy.

We are in receipt of a new catalogue of the Mechanics' and Shoemakers' Tools manufactured by Frank Parr & Co., Buffalo, N. Y. It represents their line of Screwdrivers, Shovel and Kitchen Knives, Awls, Peg Breaks, Nail Sets, Screwdriver Bits, &c. Walsh, Hoen & Von Kapff, Baltimore, Md., are mentioned as general agents for the South.

The Palmer Mfg. Company, 290 Pearl street, New York, and 118 Lake street, Chicago, Ill., issue extra pages intended for insertion in their catalogue. These pages are perforated on the four sides, so as to facilitate the making of them the proper size for pasting in the list, the margins being utilized in calling attention to some of the special features of the company's manufactures.

The Mexican Vice-Consul at Kansas City is reported to have said that during a recent extended tour in Mexico he noticed that the salesmen of vehicles and implements for German houses were getting custom away from those of this country by means of their almost universal knowledge of the language. The Mexicans, it is said, admire and deal with the man who speaks their language, and it makes little difference what inducements, in the way of time and discounts, the English-speaking salesman may offer. The Mexican merchant will deal with the house that sends to him a man who can speak his language; although it may be only in an indirect manner.

The Roberts, Hardwicke & Taylor Company, Sherman, Tex., formerly Roberts, Hardwicke & Taylor, announce that with the change in style of firm there is no change whatever in its membership or management, it being still composed of C. N. Roberts, Geo. E. Hardwicke, W. W. Taylor, G. M. Etter, J. H. Omohundro and H. C. Handy. In making this announcement the company express their appreciation of the patronage given their house in the past, and their purpose to merit its continuance in the future.

The suit of the Hoff, Renner & Adam Mfg. Company, of Cincinnati, against the Ironclad Mfg. Company, of this city, for alleged infringement of the Hoff patent of June 19, 1883, relating to improvement in Coal Hods, was, it will be remembered, originally decided against the Ironclad Mfg. Company on the first claim of the Hoff patent, but before judgment was rendered, the Court granted a new trial. Since then the case has been tried before Judge Wallace, of the United States Circuit Court, Southern District of New York, who decided it in favor of the Ironclad Mfg. Company. The Hoff, Renner & Adam Mfg. Company have, we are advised, appealed the case to the Supreme Court of the United States, so that the matter is awaiting final decision.

The Clapboard or Siding Marker, which is made by the Stanley Rule and Level Company, New Britain, Conn., and 29 Chambers street, New York, and illustrated in their advertisement on page 9, is reported to be finding favor with carpenters, and a ready sale wherever it is introduced. The special features of this tool and its utility to a house carpenter are indicated in the illustration given.

The Roberts Hardware Company, successors to C. E. Roberts & Co., Denver, Col., issue an exceedingly neat and attractive pamphlet, containing the following

RULES AND INSTRUCTIONS, which we take especial pleasure in laying before our readers. They will be found worthy of their careful attention, and will, doubtless, be useful to merchants who are desirous of having correct and business-like

Trade Report.

methods in their stores. Employees will also find them suggestive, calling attention as they do to points which, through carelessness or the prevalence of lax and unbusiness-like habits, are often overlooked. If this code of rules were generally followed, there would be an improvement in the manner in which the business of many stores is conducted, and the clerks who were actuated by the spirit that underlies them would be of greater value to their employers, and have a better outlook for a successful business career. The rules are as follows:

Rules and Instructions of the Roberts Hardware Company.

Keep your eyes on the front door. Customers should be waited on promptly and pleasantly.

Salesmen, when disengaged, will take position near the front door, instead of the back. Customers do not come in at the rear.

Salesmen are paid for waiting on customers, and are not expected to turn them over to the boys, or new men who are learning the business, while they busy themselves arranging or putting away goods.

Do not take a customer away from another salesman until he is through with him.

Do not turn a customer over to another clerk, if possible to avoid it, except for the dinner hour.

Go for business in every direction; in the store or out of it; wherever you see a chance to make a sale, work for it with all your might. Rustle.

At retail the dozen price is to be allowed only when the customer takes a half-dozen of each kind or more. Less than half-dozen, in all cases, to be at price for each.

Sorting up a line of goods allowed to make the quantity, the highest dozen price of the lot to be charged when a half-dozen or more are bought.

Clerks of other dealers are to be charged regular retail prices. If the houses they work for buy the goods for them, it is a different matter.

Do not send a customer up stairs or down by himself.

Salesmen will avoid the responsibility of trusting customers whose credit is unknown to them by referring all such cases to the manager. Extending credit without authority makes the salesman responsible for the amount.

Never show a price list to a customer; it confuses him, and he thinks he is paying more than he should when he sees the three columns of prices.

Salesmen are expected to sell the goods we have, not the goods we have not.

Salesmen are responsible for their mistakes and any expense attending their correction.

Always charge goods first in the day books. Make out the bill from the charge in the book. Make this an invariable rule.

If you have a charge to make enter it before waiting on another customer; your memory is apt to be defective, and the sale forgotten before it is entered.

Make your charges accurate in detail or description, by number, size, &c.; by so doing it facilitates correction in case of dispute with the customer.

Clerks receiving change from the desk will count same and see if correct before handing it to the customer. Always hand the cash men, with the money to the cashier.

If you know of an improvement of any kind suggest it at once to the manager; it will be impartially considered.

Keep retail stock full and complete on the shelves, so as to avoid detaining customers. Notify each man in charge of a division when you find anything short in it.

Always put the stock in order when through waiting on customers.

Each clerk is expected to see that his department is kept clean and in perfect order. In arranging goods put the smallest to the front; when the same size, cheapest to the front.

Use the early part of the day and the last hour before closing in sorting and straightening up.

Prices are not to be cut. Report every cut price by other firms to the manager after the customer is gone, unless he is a well known and regular customer, in which case report at once.

Do not smoke during business hours in or about the store.

Employees are requested to wear their coats in the store. It is not pleasant for a lady to have a gentleman waiting on her in his shirt sleeves or with his hat on.

Employees are expected to be on hand promptly at the hour of opening.

Do not leave the store by the rear door.

Employees will remain until the hour of closing, unless excused by the manager.

The company will ask of you as little work after regular hours as possible. When demanded by the necessities of business, a willing and hearty response will be appreciated.

If an employee desires to buy anything from stock, he must buy it of the manager; in no case to take anything without doing so.

In purchasing for individual use around town, under no circumstances to use the name of the company as a means to buy cheaper.

Employees pay for whatever they damage; they are placed on their honor to report and pay for it.

Goods and tools (new or old) must not be lent; it kills the sale for them. Refer all borrowers to the manager. Who goes into a clothing store to borrow a shirt or to a grocery to borrow sugar?

Never use new tools.

When through using the store tools, put them back in the place they belong.

Employees using bicycles will keep them in the cellar, or in the back yard; they must not be left where they will cause inconvenience.

Conversation with the bookkeeper, or the cashier, except on business, interferes materially with the work. Do not forget this.

Clerks, when on jury duty, have the privilege of turning in their fees, or having the time absent deducted from their wages. Drawing a salary for their services, the Company is entitled to their time, or its equivalent.

Any goods sent out to be repaired must be entered in the book kept for that purpose, and when returned reported at the desk and the charge cancelled.

Watch the ends of stock, make as few as possible, and always work them off first, to keep the stock clean.

It will Pay You to Learn the Following by Heart.

Toward customers be more than reasonably obliging; be invariably polite and attentive, whether they be courteous or exacting, without any regard to their looks or condition; unless, indeed, you be more obliging and serviceable to the humble and ignorant.

The more self-forgetting you are, and the more acceptable you are to whomsoever your customer may be, the better you are as a salesman. It is your highest duty to be acceptable to all.

Cultivate the habit of doing everything rapidly; do thoroughly what you undertake, and do not undertake more than you can do well.

Serve buyers in their turn. If you can serve two at once very well, but do not let the first one wait for the second.

In your first minute with a customer you give him an impression, not of yourself, but of the house, which is likely to determine, not whether he buys of you, but whether he becomes a buyer of the house or a talker against it.

If you are indifferent, he will detect it before you sell him, and his impression is made before you have uttered a word. At the outset you have to guess what grade of goods he wants, high priced or low priced. If you do not guess correctly, be quick to discover your error, and right yourself instantly; it is impertinent to insist upon showing goods not wanted. It is delicately polite to get to what is wanted adroitly on the slightest hint.

Do not try to change a buyer's choice, except to this extent: always use your knowledge of goods to his advantage if he wavers or indicates a desire for your advice. The worst blunder you can make is to indicate in a supercilious manner that we keep better goods than he asks for.

Show goods freely to all customers; be as serviceable as you can to all, whether buyers or not.

Sell nothing on a misunderstanding; make no promises that you have any doubt as to the fulfillment of, and having made a promise, do more than your share toward its fulfillment, and see that the next after you does his share, if you can.

To sum up and put this whole matter in a few words: Attend strictly to business when on duty; be invariably polite and obliging to every one, not only for the benefit of the company, but for your own good. Remember that civility, while it may be one of the scarcest articles in the market, is also one of the cheapest, and the net profit on it to you in the end will be greater, not only from a social and moral point of view, but in dollars and cents, than on anything else you may have to offer a customer.

Coal Market.

The Anthracite Coal market is fairly active, and more frequent inquiries indicate a disposition to buy, as at various points stocks have been permitted to run quite low. The long-expected break in prices some have been looking for does not come, and it is impracticable to delay much longer to provide for future wants, lest in a scramble later in the season, advancing freights, scarcity of cars and detention at shipping ports, prove a detriment. Prices are firm at the regular quotations: Broken, \$3.50 @ \$3.85; Egg, \$3.60 @ \$3.95; Stove, \$3.05 @ \$3.15; Chestnut, \$3.85 @ \$4.05; Pea, \$2.75 @ \$3. The output of Anthracite for May somewhat exceeds the estimates and one accumulation exists equal to about 750,000 tons. For July, the requirements will exceed \$2,500,000. The production for the week ending June 11, was 723,000 tons, and the total since January 1, is 14,718,000, compared with 13,251,000 for the same time last year. The Pennsylvania Railroad has increased its tonnage this year 1,084,000 tons over 1886. About the expediency of advancing prices next month there are various opinions.

The Bituminous trade is unchanged, with prices firm. Quotations are \$3.50 alongside in New York, and \$3.25, f.o.b., at South Amboy. The Coke workers' strike excites little remark.

The Iron and Steel Works of Youngstown, Ohio.

A recent visit to Youngstown, Ohio, disclosed a very satisfactory condition of business in the iron and steel works of that flourishing city, with the exception of the temporary inactivity now witnessed among the blast furnaces of the West in consequence of the restricted supply of coke. The Brier Hill Iron and Coal Company are the largest manufacturers of pig iron in that vicinity, but, of all their blast furnaces, they are only able to secure enough coke to run one of their Himrod furnaces, partly on Brier Hill coal and on coke, which can be picked up outside of the Connellsville region. Mr. Joseph G. Butler, Jr., the manager of the Brier Hill Company, is taking advantage of the cessation of work at his furnaces to get them into excellent shape for another season of activity which he believes will come as soon as the coke strike has been settled. The restriction of the production of pig iron will, he thinks, operate very beneficially on the trade in sustaining prices by keeping the supply and demand close together for some time to come.

The Youngstown Rolling Mill Company is one of the few rolling mills in the city not operated with natural gas. Arrangements have been made, however, to have gas piped into the works soon. They are now running their force double turn, with all the orders they want up to the 1st of July. They have recently built a new wing to their mill and put in two Smith gas-heating furnaces, two Porter-Hamilton engines and two trains of rolls. They make a specialty of iron and steel hoops and bands, but intend to go largely into the manufacture of merchant iron and steel. The intention is to make the steel feature prominent, and they have lately used a considerable quantity of both imported and domestic steel billets. During the past year this establishment turned part of its product into cotton ties for sale in the South, but at present is doing nothing in this line. This is partly due to the cheapness of imported ties and partly to the high freight rates which have been established to Southern points since the Interstate Commerce law went into effect.

Messrs. Cartwright, McCurdy & Co. are very busy. They are making some improvements in the interior arrangement of their mill, in the way of putting up individual engines, so as to run certain parts of their machinery more economically. They are also putting in a new smith shop, and making a number of other minor improvements. They are now turning out all sizes of bar and guide iron, as well as hoops and bands. Thus far they have used iron exclusively, and have not manufactured anything in steel. They are watching the tendency of trade very closely, however, and hope to be ready whenever the time comes to put in a steel plant of their own. Last year they made 3000 tons of cotton ties, but this trade has gone from them entirely at present, owing to causes which were stated above.

Natural gas is used for fuel exclusively in their works. They say it gives excellent satisfaction in almost every respect. The pressure at the works is about 45 pounds to the square inch, which is reduced in the regulator to about 1/2 pound before entering the mill pipes.

Messrs. Brown, Bonnell & Co. have been very busy for some time, but say they are now seeing daylight through their orders. The General Manager, John I. Williams, who has passed 40 years in the manufacture of iron and the management of iron works, says, that notwithstanding his experience in previous times of brisk trade, he never underwent so much pressure as during the first four months of this year. The present decrease in business is, therefore, a welcome relaxation from too heavy a strain.

These works are now prepared to furnish structural shapes, such as beams and channels, up to 12 inches; angles, up to 6 x 6 inches, &c. The demand for bridge and car work has taken so much of their attention up to the present time that they have not pushed this branch of their business, but they expect now to be able to devote more attention to structural lines. Their nail department, as might be expected under the present condition of affairs, is not running full time, about half their machines being operated part time merely to fill orders for regular customers. They are running one blast furnace on part coal and such coke as they are able to secure. Their other furnace is being repaired, having given out just at the time the strike began. These works do not use much steel except where customers require it, although they manufacture both iron and steel nails. They have introduced pipes for the use of natural gas, but thus far have not been able to get the necessary supply to justify running on this fuel.

The Mahoning Valley Iron Company report their trade much quieter than it was two months ago. They are using natural gas to some extent, but have thus far been unable to get a sufficient supply for their entire mill. Their nail factory was started last week after having been idle for six weeks. They manufacture iron nails exclusively; no steel has been turned out by this mill for several months past. They are, however, watching the course of affairs closely, and may possibly introduce the use of steel in some lines when necessary. The best demand they have at present is for their Acme polished shafting, which they are unable to turn out fast enough to fill orders. A single order for 100 tons was received on one day last week. The company are taking advantage of the coke strike to repair their furnace and get it in shape to do excellent work after they are able to start again.

Messrs. Andrews Bros. & Co., whose blast furnaces and rolling mills are at Hasleton, a suburb of Youngstown, are very busy endeavoring to get out all their orders by the 1st of July. They are taking in very little new work, having a sufficient quantity of orders on their books to keep them busy up to that time. They are able to get a full supply of natural gas, and are now using no coal whatever in their mills. They have introduced a novel method of utilizing waste heat from their puddling furnaces to raise

steam. Instead of putting boilers over the furnaces they put them directly in front, arranging them in such a way that the neck of the furnace projects the flame into one of the flues of the boiler. The boilers have two flues, so that the flame passes through one and then along the other before it reaches the smokestack, which is located right over the point of union of the furnace and the boiler. This method was in use while they were still burning coal, and complete combustion of that fuel was then effected, no smoke passing out of the stack. By this system they secure steam enough to operate their entire finishing department. At present they are devoting their attention very largely to the manufacture of iron, rolling some steel, but not any considerable quantity. An important branch of their business is the rolling of special shapes, some of their customers owning the rolls used for turning out their particular kind of iron. They have two blast furnaces, but only keep one in operation at a time. Having their own coke ovens, in what is known as the Pittsburgh region, they are able to run their furnaces without any regard to the Connellsville strike. The coke they use is known as the Imperial coke, and is made from washed coal.

The newest large enterprise at Youngstown is the establishment of the American Tube and Iron Company. This is a branch of the pipe works at Middletown, Pa. The Youngstown works broke ground for construction in May of last year, and were running within six months thereafter. They purchase all their skelp iron, having no rolling mill connected with their works. They employ about 335 men double turn, and now manufacture about 150 tons of pipe daily, using natural gas for fuel exclusively. As these works were built expressly to use natural gas, and the company made their own fittings, they claim that in this respect their mill is a model of its kind. Many of the devices used are original with them. Great rapidity of production, as well as excellence of product, has been secured. Last winter, with a new mill, they supplied pipe at the rate of 1 1/2 miles a day for the line which at present furnishes them with gas. When this company was first organized they manufactured pipe from 1/2 inch to 6 inches in diameter, but at present they are making all kinds of steel and iron tubing up to 16 inches in diameter, and they can make it over 30 feet in length, which is claimed to be the longest tubing made by any concern in the world. A specialty of their business is the manufacture of boiler tubes, for which they use a superior quality of charcoal iron, rolled expressly for their use at Altoona, Pa. These mills are furnished with the most approved machinery, much of which has been especially designed by the officers of the company, and every arrangement has been made for manufacturing and shipping to secure the greatest amount of convenience and rapidity. Railroad tracks run directly into the mill, so that stock can be unloaded and pipes shipped with a minimum of handling. The company have their own electric light plant, and also have a gas plant for the manufacture of artificial gas in case of a failure in the supply of natural gas. These works are run on a non-union plan, a brief but decisive contest having been precipitated on the management shortly after they started, which resulted in the filling of the works with non-union men.

The gas which is furnished to the Youngstown works is supplied by two companies, known as the Ohio Gas Fuel Company and the Mahoning Gas Fuel Company. One of these companies pipes the gas 56 miles and the other 50 miles, both bringing it from Pennsylvania. The supply is sufficient to furnish the citizens of the place with all the gas they need for fuel, and almost enough for manufacturing purposes. The deficiency is expected to be corrected very shortly.

The business men of Youngstown are alive to the advantages of that location for varied manufactures, and are now doing what they can to attract the attention of the capitalists and manufacturers of other sections to these advantages. They have recently formed what is known as the Youngstown Industrial Exchange, of which H. O. Bonnell is president; J. G. Butler, Jr., first vice-president; L. E. Cochran, second vice-president; Dr. J. F. Wilson, secretary; J. Craig Smith, treasurer, while other prominent citizens are members of the Board of Trustees and of the various committees which have been organized to look after special matters. They have issued circulars in which they point out the advantages which Youngstown offers, among which are connections with the four great trunk lines of the country, the Erie, the Pennsylvania, the Baltimore and Ohio and the Lake Shore, as well as a number of other important railroads. The city now has a population of 25,000, with a number of large and growing suburbs. The secretary of the exchange is already in communication with a number of manufacturers from other points who are looking closely into the opportunities offered at Youngstown, and the citizens are sanguine that they will shortly secure some desirable additions to their industries.

About 6 miles from Youngstown is an iron manufacturing town called Hubbard, which is now becoming known to fame through the efforts made by the Hubbard Tinning Company to establish there the beginning of a tin-plate trade. Their works are very modest, consisting simply of the necessary tanks and furnaces for the coating of black sheets, which at present are brought from England, because they can be imported at a lower price than similar sheets can be bought for from domestic makers. The works consist of a small frame building, which has been especially put up for the purpose, but is simply intended to be used for this experiment. It is erected in such a way that additions can be made to it if it is found that the manufacture will be profitable. The projectors of the company state that they now have had a chance to test the labor cost, and they find they are able to sell the plates which they make in competition with imported plates at a fair profit. They can turn out about 1000 sheets a month. The plates they have manufactured so far, however, are roofing plates and not bright plates. The roofing plates which they exhibit certainly present a very

handsome appearance when compared with imported plates. They state that this is due to the use of Kansas lead, which gives the domestic plates a much better color than the imported ones. It is also claimed that their coating is thicker and better than that of the foreign plates. The company expect to manufacture bright plates ultimately, but are feeling their way cautiously in this new branch of business. They are employing about eight hands now, among whom are a number of experienced workmen who have been brought from the Welsh tin plate works.

The rolling mill at Hubbard is now in active operation. It stood idle for several years until quite recently, when it was taken hold of by Youngstown parties who organized the Hubbard Iron Company. They manufacture merchant iron and have been in full operation since February. They are now running about 150 men on both turns. Natural gas is not used here, as the pipe line is some three miles distant.

The Hubbard Furnaces, owned by Andrews & Hitchcock, are not now in operation, owing to the Coke strike, but will be started again as soon as a supply of coke can be obtained.

It will be observed that the manufacture of steel does not seem to be regarded with much favor by the Youngstown manufacturers. There are no steel works at Youngstown, with the exception of a small open-hearth plant which has not been run regularly. This is partly due to the investments made in other directions. Youngstown capital controls the Western Steel Company, at St. Louis. When these works were leased by a Youngstown syndicate composed of the Youngstown Rolling Mill Company, Andrews Bros. & Co. and the Mahoning Valley Iron Company, the intention was to manufacture soft steel slabs and billets to be rolled into finished forms at Youngstown and other places. It was found, however, that at that time there was hardly a sufficient demand to justify the attempted sale of the entire output in this shape, and ultimately the steel-rail business became so good that it was thought opportunities in that direction for securing a profit were better than in the manufacture of slabs and billets. The entire output of the St. Louis works now goes into rails, notwithstanding the fact that they have produced there some of the finest soft steel that has been used by the manufacturers of the country. The possibilities of the location of a large steel works at Youngstown have been frequently discussed, but thus far matters have taken no definite shape.

Secretary Whitney on Increased Appropriations.

(From Our Washington Correspondent.)

The Secretary of the Navy is feeling quite content with the prospects of liberal legislation at the next session of Congress for the building not only of additional ships, but floating batteries and iron and steel defenses for coast and harbor protection. The movement in the city of New York looking to some local measures of defense indicates the uneasiness of the people at the great seaports. The Secretary said: "A vigorous public sentiment in favor of coast defense in ships, forts and ordnance would greatly strengthen the tendency among the leading men in Congress to make liberal appropriations for this necessary work. We have opened the way, and I think that there will be no trouble in securing authority for additional ships and guns. All this will help along the general work, and will continue to increase the demand for iron and steel."

The Secretary then went on to explain that he had conversed freely with men on both sides and in both the Houses of Congress, urging the necessity of prosecuting the work of naval construction, and found them favorably inclined. He added: "I am receiving letters constantly, referring to the great advantage which the demands of the work already authorized had been to the iron trade. For the ships now under construction by the Cramps, of Philadelphia, alone, upward of 1,250,000 pounds of steel have already been delivered or are ready for delivery, and that is but a beginning. The completion of the extended plant at Bethlehem will further increase the market, and the navy yard at Washington will soon be ready to begin in every department of its work. It appears to me that the Government as a large purchaser of steel in various forms, directly or indirectly, will keep up a healthy demand."

"Will you recommend any legislation?" "I shall ask Congress for authority to build more ships. By the time Congress assembles, all the ships already authorized will be well under way. It will take some months to get the new ones started. By that time those which are now progressing rapidly will be ready to launch and give place for new ones."

The secretary is evidently thoroughly aroused on the subject of the rebuilding of the navy, and will leave no stone unturned to continue the work vigorously. In addition to the necessity of building the ships in order to raise the navy to something like the requirements of a first-class power, he thinks the Government as a large consumer stimulates the market, and directly or indirectly benefits all branches of industry.

REMARKABLE RESULTS IN STEEL CASTINGS.

The report of Robert H. Galt, U. S. N., showing the tensile tests of the steel casting for the rudder frame for gunboat number two, being built at Baltimore, has just been received from the Midvale Works. This material, while showing a very high ultimate strength, 72,193 pounds, gave the most remarkable elongation of 32.50 per cent., with a reduction of area of 37.91 per cent.

Lieutenant Milligan, who has been keeping the record of tests from the beginning, says that these are the most remarkable results yet attained. The cold-bending specimens were bent through an angle of 116° without showing a trace of fracture. Lieutenant Milligan further says that a comparison he has made of the results in foreign establishments shows that our steel makers are now far ahead of anything ever turned out abroad.

WHOLESALE METAL PRICES, JUNE 22, 1887.

METALS.

IRON.—Duty: Bars, 6-10¢ to 11-10¢; provided that no Bar iron shall pay a less rate of duty than 35¢. Sheet, 11-10¢ to 13-10¢. Band, Hot and Cold, 14¢ to 15-10¢. Railroad Bars weighing more than 25 lb. yard, 7-10¢ to 14¢.

Standard American Pig Iron.

Foundry No. 1, X..... 21.50 @ 23.50
Foundry No. 2, X..... 19.50 @ 20.50
Gray Forge..... 18.00 @ 19.00

No. 1 Scotch Pig Iron.

Carnegie..... 22.75 @ 23.75
Cottrell..... 22.00 @ 23.00
Shotts..... 21.75 @ 22.75
Glenbrook..... 21.00 @ 22.00
Langdon..... 21.00 @ 22.00
Sumner..... 21.00 @ 22.00
Dunmellington..... 20.00 @ 21.00
Kilgint..... 20.00 @ 21.00
Hyde..... 20.00 @ 21.00

Rails.

feet, at Eastern mills..... 38.00 @ 40.00
Old Rails, Ts..... 21.50 @ 22.00

Scrap.

Wrought, 1/2 ton, from yard..... 22.50 @ 23.00

Bar Iron from Store.

Common Iron..... 21.50 @ 22.00
1/2 to 1 in. round and square..... 21.50 @ 22.00
1 to 6 in. 1/2 to 1 in..... 21.50 @ 22.00

Refined Iron..... 21.50 @ 22.00
1/2 to 1 in. round and square..... 21.50 @ 22.00
1 to 6 in. 1/2 to 1 in..... 21.50 @ 22.00

Rods—1/2 and 1-1/2 round and square..... 21.50 @ 22.00
Bands—1 to 6 in. round and square..... 21.50 @ 22.00
Burdett's Best Iron, base price..... 3.50 @ 4.00
Burdett's "H. B. & S." Iron, base price..... 3.00 @ 3.50
Norway Rods..... 3.00 @ 3.50

Sheet Iron from Store.

Common..... 21.50 @ 22.00
1/2 to 1 in. 1/2 to 1 in..... 21.50 @ 22.00
1 to 6 in. 1/2 to 1 in..... 21.50 @ 22.00

Galvanized 16 to 20..... 4.50 @ 4.75
Galvanized 21 to 24..... 4.50 @ 4.75
Galvanized 25 to 28..... 4.50 @ 4.75
Galvanized 29..... 4.50 @ 4.75
Galvanized 30..... 4.50 @ 4.75
American Russia..... 4.50 @ 4.75
Russia..... 4.50 @ 4.75
American Cold Rolled B. B. W. 5 @ 7..... 4.50 @ 4.75

Iron Wire.—(See Wire.)

STEEL.—Duty: Ingots, Bars, Sheets, &c., valued at 4¢ per lb. or less, 45¢ ad. val.; valued above 4¢ and not above 7¢ per lb., 25¢ ad. val.; valued above 7¢ and not above 10¢ per lb., 25¢ ad. val.; valued above 10¢ per lb., 25¢ ad. val. Steel Bars, Rods, &c., cold hammered or polished, in any way in addition to ordinary hot rolling, 14¢ per lb. in addition to above; Steel Circular Saw Plates, 1¢ per lb. in addition to the above.

American Cast Steel.

For American Steel see Pittsburgh quotations.

Chrome Steel.

Tool Steel, ordinary sizes, 1/2 to 3 inches, 10 @ 14¢
Adamantine Shoes and Pins..... 14 @ 15¢
Magnet Steel..... 14 @ 15¢

English Steel.

Best Cast..... 14 @ 15¢
Extra Cast..... 14 @ 15¢
Circular Saw Plates..... 14 @ 15¢
Swaged Cast..... 14 @ 15¢
Best Double Sheet..... 14 @ 15¢
Blister, 1st quality..... 14 @ 15¢
German Steel, Best..... 14 @ 15¢
3d quality..... 14 @ 15¢
Sheet Cast Steel, 1st quality..... 14 @ 15¢
3d quality..... 14 @ 15¢
3d quality..... 14 @ 15¢

TIN.—Duty: Plates, Sheets, Tagger and Terner, 1¢ per lb.; Bars, Block and Pig free.

Banca..... 24 1/2 @ 25 1/2
Braze..... 24 1/2 @ 25 1/2
English..... 24 1/2 @ 25 1/2
Bar..... 24 1/2 @ 25 1/2

Charcoal Tin Plates.

C 10x14 225 sheets..... 5.00 @ 5.75
C 12x12 225 sheets..... 5.00 @ 5.75
C 10x20 112 sheets..... 5.00 @ 5.75
C 12x12 225 sheets..... 5.00 @ 5.75
C 10x20 112 sheets..... 5.00 @ 5.75
C 12x12 225 sheets..... 5.00 @ 5.75
C 10x20 112 sheets..... 5.00 @ 5.75
C 12x12 225 sheets..... 5.00 @ 5.75
C 10x20 112 sheets..... 5.00 @ 5.75
C 12x12 225 sheets..... 5.00 @ 5.75

Coke Tin Plates.

Best..... 4.50 @ 4.75
Ordinary..... 4.00 @ 4.25
C 10x14..... 4.50 @ 4.75
C 12x12..... 4.50 @ 4.75
C 10x20, gutters, 225 sheets..... 5.00 @ 5.75
C 12x12 112 sheets..... 9.00 @ 9.50

Terne Plates.

Prime Char. 3d quality..... 13.25
C 14x20 Old Process..... 6.50
C 30x28..... 13.25
C 14x20..... 4.50 @ 4.75
X 14x20..... 5.75 @ 6.00
C 30x28..... 5.75 @ 6.00
X 14x20..... 5.75 @ 6.00
X 30x28..... 5.75 @ 6.00

Tin Boiler Plates.

1XX 14x20, 2 sheets for No. 7, 112 sheets..... 12.00
1XX 14x20, 2 " " No. 8..... 13.00
1XX 14x20, 2 " " No. 9..... 15.00

COPPER.—Duty: Pig, Bar and Ingot, 4¢; Old Copper, 3¢. Manufactured (including all articles of which Copper is a component of chief value), 35¢ ad. valorem.

Ingot, Lake..... 10 1/2 @ 10 3/4
Ingot, Baltimore..... 10 @ 10 1/2
Ingot Anchor..... 10 @ 10 1/2

Cold Rolled Sheet.

6 oz. per square foot and heavier..... 21 1/2 @ 22 1/2
4 and 15 oz. per square foot..... 21 1/2 @ 22 1/2
12 and 13 oz. per square foot..... 21 1/2 @ 22 1/2
10 and 11 oz. per square foot..... 21 1/2 @ 22 1/2

Tinning.

Sheets, one side, 10, 12 and 14 x 48..... each, 8¢
Sheets, one side, other sizes..... square foot 2¢
For tinning both sides, double the above prices.
For tinning boiler sizes, 9 in., 14 x 60..... each, 15¢
For tinning boiler sizes, 8 in., 14 x 56..... each, 15¢
For tinning boiler sizes, 7 in., 14 x 52..... each, 15¢

Sheathing Copper. (14 x 48.)

Hot..... 16 @ 17
Cold..... 16 @ 17
14 oz. and up to 16 oz., per lb..... 16 @ 17
2 oz. and up to 14 oz., per lb..... 16 @ 17
Tinning, 6 cents each.

Copper Bottoms.

Pits and Flats, 14 oz..... 21 @ 22
Pits and Flats, 12 oz..... 21 @ 22

O'Neill's Patent Planished Copper.—Net, 14x48

14 and 16 oz. and heavier, 27¢ By the case, 1/2 ton 26¢
14 oz. and lighter..... 27¢

Boiler Sizes.

7 in., 14x52, 8 in., 14x56, 9 in., 14x60, and 16 oz., and heavier, 29¢ By the case, 1/2 ton 28¢
And all sizes not over 20 in. wide.)

and 16 oz. and heavier..... 29¢
16 oz..... 29¢
14 oz..... 29¢
12 oz..... 29¢
10 oz..... 29¢
Finished Brass same price as Planished Copper.

Copper Wire.—(See Wire.)

Yellow Sheathing Metal, 1/2 lb..... 18¢ @ 19¢

BRASS AND GERMAN SILVER.

Brass & German's Gauge the Standard for Metal; Old English Gauge the Standard for Wire.

Brass Manufacturers' Price List, January 17, 1887..... 70 @ 80

LEAD.—Duty: Pig, 2¢ 1/2 per 100 lb.; Old Lead, 3¢ per 100 lb.; Pipe and Sheet, 4¢ per 100 lb.

Pig..... 4.85 @ 5.00
Bar..... 5.14 @ 5.25
Pipe..... 7.75 @ 7.85
Block Tin Pipe..... 4.9¢ @ 5.0¢
Tin Lined Pipe..... 7.5¢ @ 7.6¢
Sheet..... 7.5¢ @ 7.6¢
Shot, 1/2 bag, 35 lb..... Drop, \$1.40; Buck, \$1.65
Chilled Shot, 1/2 bag, 35 lb..... \$1.65

ANTIMONY.

Hallett's..... 9 @ 10
Cookson..... 9 1/4 @ 10

SPELTER.—Duty: Pigs, Bars and Plates, 1.50 per 100 lbs.

American, cash..... 47¢ @ 48¢
Bergenport..... 47¢ @ 48¢

ZINC.—Duty: Pig or Block, 1.50 per 100 lbs.

Sheet, 24¢ @ 25¢
600 lb. casks..... 61¢ @ 62¢
Zinc—Open..... 61¢ @ 62¢
Zinc Tubing—Dis. 25¢

Plain..... 27
Fancy..... 28
Scotch and Extra Pattern..... 28

SABBIT METAL.

X..... 10¢
X..... 10¢
X..... 10¢

WIRE.

Market Wire.—Put up in 63 lb. bundles.

Nos. 00 to 9, 10, 11, 12, 13, 14, 15, 16, 17, 18.

10 11 12 13 14 15 16 17 18

Bright Market Wire..... 67 1/2 @ 68 1/2
Charcoal..... 67 1/2 @ 68 1/2
Bale Wire, Nos. 7 to 12..... 67 1/2 @ 68 1/2
Annealed Market Wire..... 67 1/2 @ 68 1/2
Fence Wire, Nos. 10 to 14..... 67 1/2 @ 68 1/2
Grape Wire, Nos. 10 to 14..... 67 1/2 @ 68 1/2
Coppered Market Wire..... 67 1/2 @ 68 1/2
Bale Wire, Nos. 7 to 12..... 67 1/2 @ 68 1/2
Galvanized Market Wire..... 67 1/2 @ 68 1/2
Fence Wire..... 67 1/2 @ 68 1/2

Stone or Weaving Wire.

Nos. 16 17 18 19 20 21 22 23 24 25 26

Nos. 27 28 29 30 31 32 33 34 35 36 37

Nos. 38 39 40 41 42 43 44 45 46 47 48

Nos. 49 50 51 52 53 54 55 56 57 58 59

Nos. 60 61 62 63 64 65 66 67 68 69 70

Nos. 71 72 73 74 75 76 77 78 79 80 81

Nos. 82 83 84 85 86 87 88 89 90 91 92

Nos. 93 94 95 96 97 98 99 100 101 102 103

Nos. 104 105 106 107 108 109 110 111 112 113 114

Nos. 115 116 117 118 119 120 121 122 123 124 125

Nos. 126 127 128 129 130 131 132 133 134 135 136

Nos. 137 138 139 140 141 142 143 144 145 146 147

Nos. 148 149 150 151 152 153 154 155 156 157 158

Nos. 159 160 161 162 163 164 165 166 167 168 169

Nos. 170 171 172 173 174 175 176 177 178 179 180

Nos. 181 182 183 184 185 186 187 188 189 190 191

Nos. 192 193 194 195 196 197 198 199 200 201 202

Nos. 203 204 205 206 207 208 209 210 211 212 213

Nos. 214 215 216 217 218 219 220 221 222 223 224

Nos. 225 226 227 228 229 230 231 232 233 234 235

Nos. 236 237 238 239 240 241 242 243 244 245 246

Nos. 247 248 249 250 251 252 253 254 255 256 257

Nos. 258 259 260 261 262 263 264 265 266 267 268

Nos. 269 270 271 272 273 274 275 276 277 278 279

Nos. 280 281 282 283 284 285 286 287 288 289 290

Nos. 291 292 293 294 295 296 297 298 299 300 301

Nos. 302 303 304 305 306 307 308 309 310 311 312

Nos. 313 314 315 316 317 318 319 320 321 322 323

Nos. 324 325 326 327 328 329 330 331 332 333 334

Nos. 335 336 337 338 339 340 341 342 343 344 345

Nos. 346 347 348 349 350 351 352 353 354 355 356

Nos. 357 358 359 360 361 362 363 364 365 366 367

Nos. 368 369 370 371 372 373 374 375 376 377 378

Nos. 379 380 381 382 383 384 385 386 387 388 389

Nos. 390 391 392 393 394 395 396 397 398 399 400

Nos. 401 402 403 404 405 406 407 408 409 410 411

Nos. 412 413 414 415 416 417 418 419 420 421 422

Nos. 423 424 425 426 427 428 429 430 431 432 433

Nos. 434 435 436 437 438 439 440 441 442 443 444

Nos. 445 446 447 448 449 450 451 452 453 454 455

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Nos. 467 468 469 470 471 472 473 474 475 476 477

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Nos. 489 490 491 492 493 494 495 496 497 498 499

Nos. 500 501 502 503 504 505 506 507 508 509 510

Nos. 511 512 513 514 515 516 517 518 519 520 521

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Nos. 566 567 568 569 570 571 572 573 574 575 576

Nos. 577 578 579 580 581 582 583 584 585 586 587

Nos. 588 589 590 591 592 593 594 595 596 597 598

Nos. 599 600 601 602 603 604 605 606 607 608 609

Nos. 610 611 612 613 614 615 616 617 618 619 620

Nos. 621 622 623 624 625 626 627 628 629 630 631

Nos. 632 633 634 635 636 637 638 639 640 641 642

Nos. 643 644 645 646 647 648 649 650 651 652 653

Nos. 654 655 656 657 658 659 660 661 662 663 664

Nos. 665 666 667 668 669 670 671 672 673 674 675

Nos. 676 677 678 679 680 681 682 683 684 685 686

Nos. 687 688 689 690 691 692 693 694 695 696 697

Nos. 698 699 700 701 702 703 704 705 706 707 708

Nos. 709 710 711 712 713 714 715 716 717 718 719

Nos. 720 721 722 723 724 725 726 727 728 729 730

Nos. 731 732 733 734 735 736 737 738 739 740 741

Nos. 742 743 744 745 746 747 748 749 750 751 752

Nos. 753 754 755 756 757 758 759 760 761 762 763

Nos. 764 765 766 767 768 769 770 771 772 773 774

Nos. 775 776 777 778 779 780 781 782 783 784 785

Nos. 786 787 788 789 790 791 792 793 794 795 796

The Climax Green-Corn Grater.

George Wood, 15 Warren street, Trenton, N. J., is manufacturing the Climax Green-Corn Grater or Pulp Extractor, which is represented in the accompanying illustrations, Fig. 1 giving a general view of the

ferent sizes. A model that we have inspected shows the article in a form to be of interest to many householders. It is simplicity itself, and there is no reason why it should not be effective in use. The wire strainer cloth, which covers the mouth of the pipe leading to the cistern, is put in at an

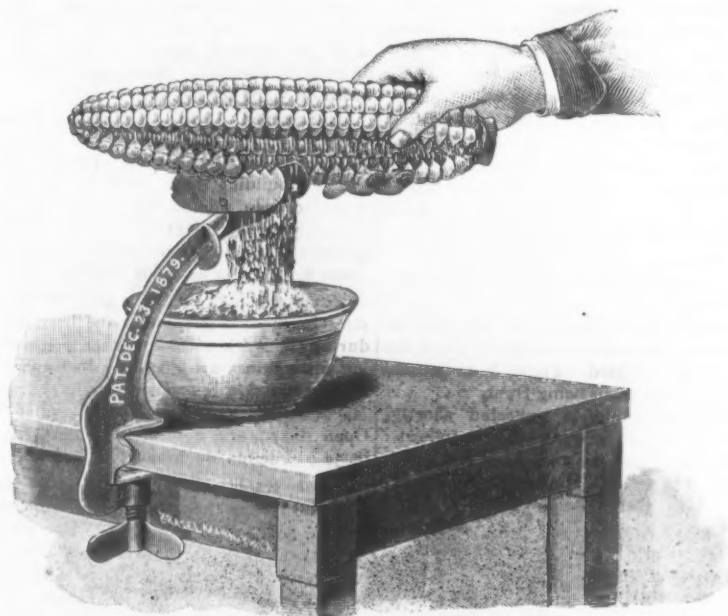


Fig. 1.—Climax Green-Corn Grater in Use.

grater attached to the table and in use, and Fig. 2 showing more in detail the construction of the grater proper, representing it about two-thirds size. It will be observed that the grater consists of a curved metal standard made of galvanized iron and provided with two parallel steel blades, one serrated and the other plain. The ear of corn is to be drawn across the blades at right

angle so that it will readily wash clean the dirt naturally running into the overflow-pipe.

New Paint Burner.

M. L. Hull, No. 48 Long street, Cleveland, Ohio, is putting upon the market the device shown in the accompanying engraving, which is described as a paint burner and vapor street lamp-lighter. With reference to the leading features of the device, the assertion is made that there are no inside works of a character to need frequent repairs. There is no pump, no piston and no valve to get out of order; hence, there is no need of stopping every few minutes to pump in air to keep up the pressure. It is further described as a flexible handle paint burner. The handle is made of rubber tubing partly shielded with a thin sheet of metal to afford stability. The valves are small rubber plugs at the top and bottom of the handle and covered by a cap which can easily be unscrewed. The pressure is produced by a simple

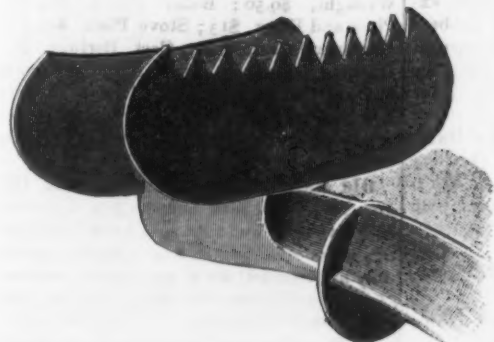


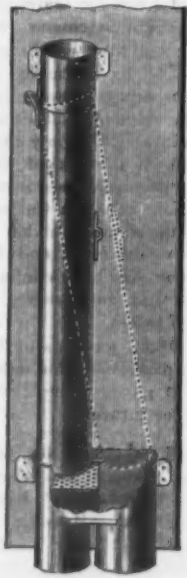
Fig. 2.—Details of Grater.

squeeze of the hand on the handle, by which the tank is held. Mr. Hull is also supplying with this device, a scraper for removing paint, that forms a desirable combination with it. In using the apparatus he advises

angles, the toothed blade first tearing out the kernels and the plain one pressing out the pulp. It is obviously simple in construction and convenient for use, as it clamps securely to the table, leaving both hands of the operator free to manage the ear of corn, while its form permits the placing under it of a dish to receive the extracted pulp. The efficiency with which it does its work of extracting all the pulp and leaving the hull is also emphasized.

Eureka Cut-Off and Strainer.

The accompanying illustration represents an article just put upon the market by Rowe & Ramey, Indiana, Pa., which has been called the Eureka Cut-off and Strainer. It consists of a pipe jointed and hinged at the



Eureka Cut-Off and Strainer.

top and connecting at the bottom with two pipes, one of which is provided with a strainer, and leads to the cistern, while the other is without any strainer device, and leads to the overflow. The tilting joint is so arranged as to be readily pulled to the overflow-pipe by a string, which can be operated from a convenient window. The weight of the water descending would carry the pipe back to a vertical position whenever the stress on the string is relaxed; accordingly, the device becomes easy of operation when in use. We understand that the makers, recognizing the fact that many tinners would prefer making this device themselves, instead of buying it ready-made, have arranged to license manufacturers and to supply them with pattern sheets for dif-



New Paint Burner.

ferent sizes. A model that we have inspected shows the article in a form to be of interest to many householders. It is simplicity itself, and there is no reason why it should not be effective in use. The wire strainer cloth, which covers the mouth of the pipe leading to the cistern, is put in at an

Domestic Sash Lock and Fastener.

B. Gantenberg, 64 Pike street, Covington, Ky., is manufacturer of this article, which is shown in the illustration herewith given. It will be observed that this sash lock has a bolt which is operated by a knob, such bolt having a spur as shown in the cut, which, when the bolt is pushed in the act of locking, can be engaged in the slot in the barrel where it remains until it is released by moving the knob. The bolt when disengaged is forced out by a spiral spring which surrounds it inside the barrel. These locks are described as made of the best material, in



Domestic Sash Lock and Fastener.

bronze or nickel plate, and are put on the market both surface and mortise, and in two styles for lip or plain sashes. Emphasis is laid on the fact that this sash lock is burglar-proof, that it will keep the sash from rattling, and is easily applied.

Combined Truck and Step-Ladder.

The I-X-L Pump Company, of Goshen, Ind., are the sole manufacturers of an article which they are putting on the market under the name of the Combined Truck and Step-Ladder. In appearance it resembles the ordinary truck for shifting heavy packages in warehouses, &c., but it is made with double sides, hinged together at the handle end with a strong bolt which passes completely through the sides. One part of the double frame has the wheels attached to it while the other part has the iron frame which is inserted under the packages to be hauled. The following cut, Fig. 1, exhibits the appearance of the implement when folded for use as a truck.



Fig. 1.—Combined Truck and Step-Ladder as a Truck.

When intended to be used as a step-ladder the double frame is opened, and the sides stretch sufficiently apart to enable the truck to stand in proper position. In place of the cross-pieces usually found in a truck small boards are used, which are wide enough for steps. The sides are prevented from slipping too far apart by a projection on the legs of the truck. The following cut, Fig. 2, illustrates the article when used as a step-ladder.

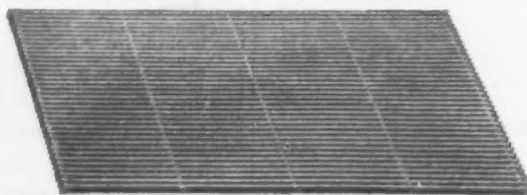


Fig. 2.—Combined Truck and Step-Ladder as a Ladder.

In addition to the uses named, this implement can be converted into a bag holder or fitted with a shelf for holding a bucket. For the latter purpose an iron frame is provided, having two arms which are inserted into the catch shown under the top step, which is so arranged as to hold the frame rigidly in a horizontal position. This frame is made with a circular end and a hinged center. When the center is in place it forms a shelf for a bucket, &c., but by touching a spring the center falls and an opening is left large enough to receive the mouth of a bag. The bag is held in position for filling by being caught between two iron bands, which form this part of the frame.

Steel Door Mat.

The Wire Goods Company, Worcester, Mass., for whom Sise, Gibson & Co. are agents, 100 Chambers street, New York, have recently put upon the market the novel mat represented in the appended illustration. It is made of thin strips of steel, which stand on their edges in the manner shown in



Steel Door Mat.

the cut, being held in place by steel rods, as indicated. The ordinary sizes of the mat are but 3/4 inch thick; thus permitting doors with low thresholds to pass readily over them, and permitting them to be placed inside

the door, as is sometimes desirable. Special emphasis is laid on their strength and durability, the claim being made that they will stand any usage to which they are subjected. The further points made in regard to it are that it operates most effectively in removing dirt from the feet, that it is reversible, self-

Combination Barbed Wire Fence Nipper.

J. E. Norton, 46 Woodward avenue, Detroit, Mich., has recently commenced the manufacture of this article, which is illus-

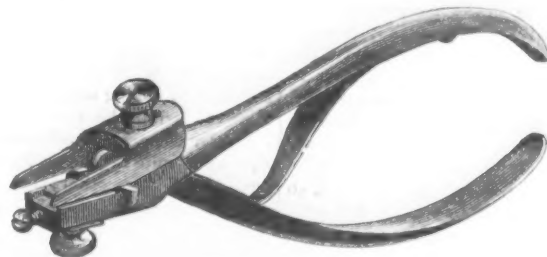


Fig. 1.—The Leopold Saw-Set.

cleaning, yielding and pleasant under foot, and always retaining its shape. This mat is made regularly in four sizes, 16 x 24, 18 x 30, 22 x 36 and 26 x 48 inches. Larger sizes are made to order. The company are now ready to receive orders.

The Leopold Saw-Set.

The American Mfg. Company, Twenty-second street and Washington avenue, Philadelphia, Pa., are putting on the market a new saw-set which is illustrated in the cuts presented herewith. Fig. 1 gives a general view

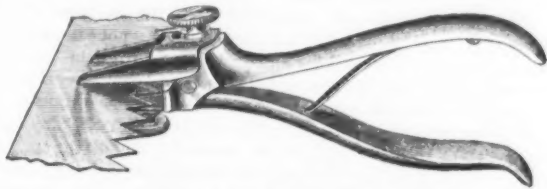


Fig. 2.—The Leopold Saw-Set with Saw.

of the saw-set, and Fig. 2 represents it in connection with a saw which is being set. The general features and operation of this tool are thus indicated: There is a steel saddle which is used in holding the saw in place, and which can be regulated by a set screw to accommodate any size of thickness of saw. The manner in which adjustment is effected for the different size and set of teeth is also indicated. As will be inferred from the illustrations, the lower arm or handle of the saw-set is the lever by

iron, and the working parts are chilled, so as to prevent them from being battered in use. They are warranted fully for the purposes recommended. They are intended also for telegraph and telephone work, and it is thought that farmers will find them convenient upon the farm, whether or not they are required for wire fencing. The tool is expected to be put on the market, so that it can be retailed at \$1.25.

Hat and Umbrella Hooks.

John Maxwell, 247 and 249 Pearl street, New York, is manufacturing a line of combined hat, umbrella and coat hooks, which

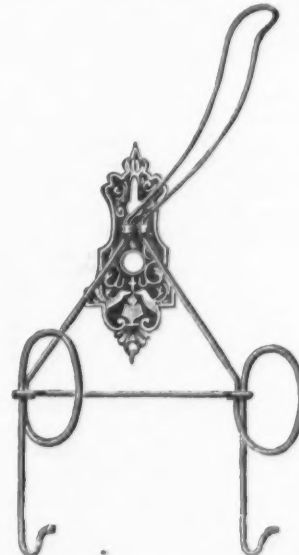
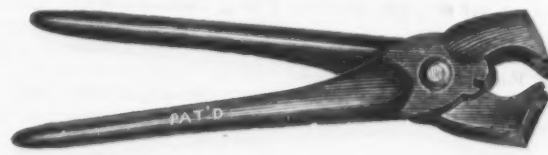


Fig. 1.—Hat, Umbrella and Coat Hook.

are represented in the accompanying illustration, Fig. 1. It will be observed that this hook consists of an iron frame by which it is attached to the wall, supporting and holding firmly in place a wire construction which furnishes support for the hat, umbrella and such garments as may be hung on the two hooks which are furnished. An-



Combination Barbed Wire Fence Nipper.

this tool are its decided action, and the ability of the user to operate it with ease without danger of the breakage of the saw-teeth. On this latter point special emphasis is laid, and it is claimed that, with ordinary care, the hardest saw may be set with ease and

other application of the same general principle is shown in the hat and coat hook represented in Fig. 2, in which it will be



Fig. 2.—Hat and Coat Hook.

observed there are no loops for holding the umbrella. These hooks are made in different styles of finish.

Trade Report.

NEW YORK.

American Pig.—The majority of dealers and furnace agents report a moderate business only in small lots, the market remaining very quiet but fairly steady. Some of the anthracite furnaces which have blown in lately are offering good Iron at concessions, but comparatively little of it comes in competition with this market, although it is not without effect upon it. Standard brands remain \$21 @ \$21.50 for No. 1 Foundry, \$19.50 @ \$20.50 for No. 2 Foundry, and \$17.50 @ \$18.25 for Gray Forge, with outside brands available at 50¢ @ \$1.00 less.

Scotch Pig.—Sales during the week have not been so large as during the fortnight preceding it, aggregating about 1000 tons. The American purchases in Glasgow appear to have created some excitement there, being looked upon as the beginning of a heavy buying movement. Nothing whatever in the situation on this side of the Atlantic warrants such expectations. The market here is firmer in sympathy. We quote: Coltness, \$22 @ \$22.50; Glengarnock, \$20.50 @ \$20.75; Shotts, \$21.50 @ \$21.75; Gartsherrie, \$21 @ \$21.25; Carnbroe, \$20.75 @ \$21; Summerlee, \$21.50 @ \$21.75; Dalmellington, \$20.25 @ \$20.75, and Eglinton, \$19.75 @ \$20.

Bessemer Pig.—The market is dull.

Spiegel.—We do not hear of any transactions or of any inquiry, and continue to quote nominally \$29 @ \$29.50 for 20 per cent. The American Iron and Steel Association have received from the Bureau of Statistics the following figures showing the imports of Spiegel during the calendar years 1884, 1885 and 1886, the first time we believe that such figures have been available. The unit is the gross ton.

	Spiegel.	Other pig.	Domestic product.
1884.....	75,478	117,857	80,362
1885.....	88,940	78,908	80,956
1886.....	130,646	228,160	42,841

Bar Iron.—Those mills which make the larger sizes are quite well supplied with orders, but on the guide-mill sizes there is considerable cutting. A few car contracts are coming up, among them one of 500 cars for the New Jersey Central, and it is expected that later on a good deal of work of this class will come in the market, chiefly for new roads now in course of construction. The differences between the men and the manufacturers in the Western mills are not expected to remain long without adjustment. It is expected that there will be a closing down for a few weeks, for the purpose of making repairs, and that by the time they are completed some arrangement will be arrived at. We quote Common, 1.8¢ @ 1.9¢; Medium, 1.9¢ @ 1.95¢, and Refined, 1.95¢ @ 2.25¢, on dock.

Structural Iron.—Building continues quite active, the magnitude of the operations being clearly shown by the following statement. In the city at large the figures stand for the first five months of each year:

	No. of buildings.	Est'd cost.
1882.....	1,079	\$17,826,270
1883.....	1,220	\$21,748,369
1884.....	1,300	\$24,415,051
1885.....	1,484	\$31,758,630
1886.....	1,903	\$30,759,133
1887.....	2,517	\$40,498,115

The bulk of the increase is, however, in small dwellings in the annexed district. In large structures calling for heavy amounts of iron there has been some falling off. Only one bid was received for the roof of the 22d Regiment Armory, requiring 750 tons of Structural Iron, and it is to be re-advertised. We quote for large quantities: Angles, 2.25¢ @ 2.40¢; Tees, 2.70¢ @ 2.75¢, and Channels and Beams, 3.30¢, base on dock.

Plates.—There is more inquiry, one large lot being now in the market. We quote for round lots of Common or Tank, 2.25¢ @ 2.50¢; Refined, 2.50¢ @ 2.60¢; Shell, 2.6¢ @ 2.8¢; and Flange, 3.5¢ @ 3.8¢; Extra Flange, 4.25¢ @ 4.50¢. For Steel Plates quotations are as follows: Tank, 2.7¢ @ 3¢; Ship, 3¢; Shell, 3¢ @ 3.25¢; Flange, 3.25¢ @ 3.50¢, and Fire-Box, 3.75¢ @ 4.50¢, on dock.

Steel Rails.—Outside of rumors of a sale of 10,000 tons of Foreign Rails to a Southern road and a number of small lots, there is nothing to report. We quote \$38 @ \$39 at Eastern mill.

Blooms and Billets.—Negotiations pending have been dropped because of higher prices called for Foreign, the advance being about 50¢ per ton.

Wire Rods.—There have been only a few small sales. We quote \$38.50 @ \$39.

Old Rails.—On Monday the market developed sudden activity and a rising tendency, due largely to buying on the part of one or two Western consumers. There were sold in one day 1000 tons of Foreign Tees, at \$21, 300 tons of Tees, at \$21.50, 4000 tons of Double Heads, at \$22.50, and 1000 ditto, at \$22.25, all of them ex-store. In addition thereto there has been a sale of 2000 tons of American Tees, at \$22, and of 5000 tons of Double Heads for shipment, at private terms. Spot lots, ex-store, are now held at \$21.50 @ \$22 for Tees and \$22.75 @ \$23 for Double Heads.

Scrap.—The market continues extremely dull, with little Foreign from store offered, while Yard Scrap is quoted nominally \$21 @ \$22.

Rail Fastenings.—We quote Spikes, which are weaker, 2.40¢ @ 2.50¢ net; Angle Fish Bars, 2.1¢ @ 2.25¢; Steel Angle Bars, \$2 @ \$2.30; Bolts and Nuts 3¢ @ 3.20¢, and Bolts and Hexagon Nuts 3.2¢ @ 3.30¢.

Metal Market.

Copper.—There is a decidedly better feeling in the Copper market since our last week's report. This is partly owing to the revulsion of feeling manifested in the English market during the last three days, where Chili Bar Copper has advanced from £39 to £40. 5/ in spite of the great interference in business on the other side owing to the Jubilee holidays. Stocks in Europe are rapidly being reduced, and are now at a point where a few years ago Chili Bars freely fetched £50 and over. The effect thereof on this market ought to be considerable; the quantity of fine Copper available for export is very small, and already large inquiries are in the market to pick up Scrap Lake Copper of any brand at 10¢, cash. Holders, however, have raised their limits to 10.10¢, and would only part with small lots at the improvement. Futures are higher; September delivery is wanted at 10 1/4¢, October at 10.30¢, November and December would readily fetch 10.35¢, but it is difficult to find sellers near these quotations, and then only of trifling lots. Best Selected remains steadily in London at £44. 10/.

Tin.—At last the almost entire exhaustion of stocks here of Pig Tin has shown itself, and the market seems to have cornered itself, notwithstanding the great efforts made to hold prices down, the demand from consumers having so closely exhausted the small stocks in the hands of our dealers that yesterday 23.30¢ and 23.35¢ were paid and bid for spot and June delivery Tin, which last week was readily parted with at 22.85¢. This advance of 1/2¢ per lb will probably be the beginning of a further considerable rise commensurate with the scarcity of available supplies. Futures have naturally followed the advance of spot, although not to the same degree. July delivery sold from 22.75¢ to 23¢, closing with buyers at the highest. The first fortnight of July was paid 23.10¢ and buyers thereat; August is 22.85¢ @ 22.90¢; September to October, 22.70¢. The turnover since our last report cannot have been less than 300 tons. The London market has improved from £101. 17/6 to £103. 5/ spot and futures, and is held down by main force by the bear operators. At the Metal Exchange, first call 10 tons, spot, sold at 23.35¢. Tin Plates.—A brisk demand has prevailed on the spot, the scarcity being at the same time on the increase. Our market has improved slightly, and Liverpool is also 3d. per box higher. We quote at the close large lines, per box: Siemens-Martin Steel, Charcoal Finish, \$4.75 @ \$5.00; ditto Coke Finish, \$4.60 @ \$4.65; Charcoal Turned, \$4.30 @ \$4.50, and Coke Tin, \$4.37 1/2 @ \$4.50.

Lead.—This has been a sort of reactionary week in the Lead market. A jobbing trade has been kept up at \$4.70, but for large lots not over \$4.60 @ \$4.62 1/2 could be obtained, if as much, and the market winds up dull and nominal at that for Common, and \$4.70 Refined, St. Louis quoting the former quiet at \$4.42 1/2, and Chicago \$4.50. London dropped 5/ to £12. 5/; Soft Spanish, and £12. 10/ English Pig.

Spelter and Zinc.—The local demand for Common Domestic Spelter continues steady at 4.52 1/2¢ @ 4.55¢, ordinary brands, and at 4.85¢ for Silesian, the latter remaining unaltered in London—£14. 12/6. We quote Bertha Refined, 8¢. Sheet Zinc—Is moderately active at 6 1/2¢ @ 6 3/4¢, Domestic.

Antimony.—Is wanted, scarce and rising. London advanced to £34, with Hallet, and we have to quote the same 8 1/2¢, and Cookson, 9 1/2¢.

The American Metal Company, Limited, have been incorporated, with a capital of \$200,000, to import and export Metals and Ores. They have acquired the Metal business heretofore carried on by Messrs. Ladenburg, Thalmann & Co., and will act as sole agents for the United States of Henry R. Merton & Co., London, and the Metallgesellschaft, Frankfurt-on-Main. A. N. Stevens is president; A. Ladenburg, vice-president; J. Langeloth, treasurer, other members being E. Merton and J. Goldman. Their office is at 43 Exchange Place.

New York Metal Exchange.

The following sales are reported:

THURSDAY, JUNE 16.		
10 tons Tin, July.....	22.75¢	
30 tons Tin, October.....	22.00¢	
30 tons Tin, August.....	22.70¢	
40 tons Tin, July.....	22.75¢	
30 tons Tin, September.....	22.60¢	
50 tons Tin, July.....	22.75¢	
FRIDAY, JUNE 17.		
10 tons Tin, September.....	22.60¢	
SATURDAY, JUNE 18.		
10 tons Tin, July.....	22.75¢	
MONDAY, JUNE 20.		
30 tons Tin, July.....	22.85¢	
10 tons Tin, Sept.....	22.70¢	
TUESDAY, JUNE 21.		
30 tons Tin, July.....	22.90¢	
30 tons Tin, October.....	22.65¢	
10 tons Tin, June.....	22.30¢	
10 tons Tin, June.....	22.35¢	
10 tons Tin, July.....	22.30¢	
10 tons Tin, July.....	22.35¢	
10 tons Tin, first half July.....	22.10¢	
10 tons Tin, July.....	22.95¢	
55 tons Tin, July.....	23.00¢	

Philadelphia.

Office of The Iron Age, 220 South Fourth St., PHILADELPHIA, June 21, 1887.

Pig Iron.—The market is somewhat irregular, a little feverish on Mill Irons, but firm and strong on foundry grades. It is not easy to account for the weakness which is occasionally met with in Mill Irons, as stocks are not large, while the requirements of consumers are expected to be very heavy. Buyers are ready to take large lots, however, at about \$17, delivered, two or three important transactions having been closed at \$17.50. As a rule \$18 are asked, and in many instances realized, but, as we have said, there are others willing to quote \$17.50 for very good Iron, and in special cases a little below even that figure. Apart from that grade of Iron the market has a firm appearance. No. 1 Foundry is scarce, and in most cases held at a slight advance, but, as in Mill Irons, there are wide variations in quotations, some asking \$21.50 @ \$22, delivered at tide; others, \$21, and still others, \$20 @ \$20.50, according to circumstances. Choice brands readily command the outside rates, standard brands medium figures, while new or unknown brands are somewhat difficult to place even at comparatively low prices. What the outcome is to be does not appear very distinctly. The general conditions are better, and the feeling is becoming very hopeful and confident, but uncertainty surrounding the labor question deters a great many people from buying until they see what is to be done in Pittsburgh. The weakness in Mill Irons is said to be owing almost exclusively to the possibility of a strike, and as that is a matter upon which we have no private information we leave predictions for those who are in a position to form definite opinions. Foundry Irons, as already stated, are scarce and firm, and in the absence of strikes there is at least a fair probability of a stiffening along the entire line, and possibly slightly higher prices after the midsummer holidays.

Foreign Iron.—There is still some disposition to do business, but prices and shipments cannot be adjusted satisfactorily, so that quotations are still almost nominal at \$20.50 asked for Bessemer, and \$27 @ \$27.50 for 20¢ Spiegal.

Blooms.—There is a demand for both Rail Blooms and Nail Slabs, but at prices a full dollar below what sellers can quote, which are about as follows: Rail Blooms, \$29 @ \$30; Nail Slabs, \$29 @ \$30; Sheet-Iron Billets, \$34 @ \$36; Charcoal Blooms, \$54 @ \$55; Runout Anthracite, \$47 @ \$48; Scrap Blooms, \$38 @ \$39 per "bloom" ton.

Mack Bars.—There is more inquiry, and prices are firmer. The supply is quite limited, and held at from \$32 to \$32.50, at mill, for a good quality of Bar.

Bar Iron.—The demand has been much better within the past 10 days, and, although no large orders have been taken, the mills have secured a good deal of work of one kind or another. Prospects for consumption are unusually good, and a very large business is expected during the balance of the year. Prices are firmer and are likely to be higher, but in the meantime buyers are not inclined to place orders at any advance. Skelp Iron is still dull and neglected, with no immediate prospect of improvement. A demand from this class of trade would help the market considerably, but there is no inquiry at present. Best Refined Bars are quoted at 2¢ @ 2.1¢; medium quality, 1.85¢ @ 1.9¢; Grooved Skelp, 2¢ @ 2.05¢. At a meeting of the Philadelphia mill owners held here yesterday it was agreed to maintain 2.2¢ as the base price for labor during the month of June.

Plate and Tank Iron.—There is a good general demand, and mills are fairly well situated as regards orders. Prospects are considered very favorable and prices well maintained, with some indication of a slight advance after the midsummer holidays. Prices about as follows: Ordinary Plate, 2.25¢ @ 2.30¢; Tank, 2.30¢ @ 2.35¢; Shell, 2.5¢ @ 2.6¢; Flange, 3.5¢; Fire-Box, 4¢; Steel Plates, Tank, 2.8¢; Shell, 3¢; Flange, 3 1/4¢; Fire-Box, 3 1/4¢ @ 4¢.

Structural Iron.—The mills are full of work, and the output during the balance of the year is likely to be the largest on record. There is a good deal of work to come in yet, and it will tax the utmost capacity of the mills to handle it. Some large orders have been recently placed and at firm quotations, which are about as follows: 2.4¢ @ 2.5¢ for Bridge Plate; 2.30¢ @ 2.35¢ for Angles; 2.8¢ @ 2.9¢ for Tees, and 3.3¢ for Beams and Channels.

Sheet Iron.—There is a good demand, and at slight concessions in price large orders could be taken. The feeling among holders is very firm, however, and as consumption is large better prices are expected in the near future. Small lots quoted about as follows:

Best Refined, Nos. 25, 27 and 28.....	3 1/4¢
Best Refined, Nos. 18 to 23.....	3 1/4¢
Common, 1/4¢ less than the above.....	
Best Bloom Sheets, Nos. 25 to 28.....	4 1/4¢ @ 4 1/2¢
Best Bloom Sheets, Nos. 22 to 25.....	4 1/4¢
Best Bloom Sheets, Nos. 18 to 21.....	3 1/4¢ @ 3 1/2¢
Blue Annealed.....	2.8 @ 3 ¢
Best Bloom, Galvanized, discount.....	50 ¢
Common discount.....	60 ¢

Steel Rails.—The demand keeps up remarkably, and the entire capacity of the mills will be required to meet consumption during the balance of the year. There are some inquiries for winter delivery in large lots, but manufacturers are not anxious to increase their engagements, and quote \$38.50 @ \$39 firm for winter deliveries, and \$39.50

@ \$40 for summer, with several large lots taken at about the figures above quoted.

Old Rails.—There is more disposition to buy, but the offerings are smaller, and it would be difficult to secure any fair-sized lots of T's at less than \$22 @ \$22.25, ex-ship, which at present buyers are not willing to pay. Holders appear to be in a strong position, however, and as the demand appears to be for actual consumption it is not unlikely that still higher figures may be quoted in the near future. Store lots held at \$23 @ \$24 for T's or Double Heads.

Scrap Iron.—There is a better feeling, and prices are steady as follows with a fair demand: Cargoes of No. 1 Scrap, \$20 @ \$21; small lots, tide water delivery, \$21 @ \$22; Selected do., \$23; No. 2 do., \$16 @ \$17; Turnings, \$15 @ \$16; Old Car-Wheels, \$17.50 @ \$18.50; Old Steel Rails, \$20 @ \$21; Cast Scrap, \$16 @ \$17; do. Borings, \$12 @ \$13; Old Fish Plates, \$26 @ \$27 asked.

Wrought-Iron Pipe.—Pipe mills are all in operation and demand continues about the same as last reported. Prices however are irregular, concessions being freely made, but a general stiffening is expected shortly. Discounts during the week were as follows: Lap-Welded Black, 50¢; Lap-Welded Galvanized, 32 1/2¢; Butt-Welded Black, 32 1/2¢; Butt-Welded Galvanized, 22 1/2¢; Boiler Tubes, 42 1/2¢.

Nails.—There is little or no change in the situation since our last report. Orders are scarce and mostly small, and no immediate improvement is anticipated in demand or price. Outside brands are heard of occasionally as being offered at less than regular quotations, which has a tendency to depress price of leading brands. Quotations vary from \$2.15 @ \$2.25, according to quantity taken, &c.

Chicago.

Office of The Iron Age, 95 and 97 Washington St., CHICAGO, June 20, 1887.

The only feature of the local market worthy of special note is the unusually excellent demand for Hardware. Jobbers report a much better trade for the current month than they have had during June for a number of years. This is in spite of the building troubles in Chicago, which have cut down the city demand for Builders' Hardware to little or nothing. The excellent demand, however, is not confined to Hardware, for distributors of other staples, such as groceries, dry goods, &c., report a similar state of affairs in their lines, showing that the people of the West are prosperous or they could not buy so freely.

Pig Iron.—The demand still runs mainly to small lots. One 6000-ton order of part Charcoal and part Coke Iron was placed during the week, but very few of the other orders exceeded 100 tons, although the aggregate of sales is estimated to have been up to that of the previous week. Under the circumstances prices have been well maintained, and are tolerably firm on all classes of Iron, especially on Lake Superior Charcoal, of which the stocks in makers' hands have now shrunk to very low proportions, having only twice been as low since the records of stocks have been kept by the Western Pig Iron Association. The stocks of Coke Iron in the West will also be reduced heavily this month, and, although the Coke strike is reported to have ended, the restriction of the supply of Coke Iron is still in progress, as the furnaces have not been in a hurry to resume operations, quite a number of them standing out for a reduction in the price of Coke. Southern furnace agents are still selling off grades of Iron at very low prices, but they are not offering higher grades to any extent. All furnace agents and commission houses report a greatly increased inquiry for Standard Iron, and the prospect of improving business gives the market an undertone of decided firmness. Quotations are as follows for cash, f.o.b. Chicago: Lake Superior Charcoal, Nos. 1, 2 and 3, \$23; Southern Cold Blast Charcoal, \$27; Black-band Coke Softeners, \$22 @ \$23; Hanging Rock and Jackson County Softeners, \$21; Straight Coke Foundry, No. 1, \$22 @ \$23; No. 2, \$21.50; No. 3, \$19.50; Coke Bessemer, run of furnace, \$22; Southern Coke, No. 2, \$20; No. 2 1/2, \$19; No. 3, \$18.

Bar Iron.—Manufacturers' agents report sales of considerable quantities to jobbers, while the demand from consumers has been small. The stocking up by jobbers is probably in anticipation of a general stoppage by the Western mills after July 1, which will certainly continue two weeks for repairs, &c., and may extend for an indefinite time in case of a contest over the wages scale. Common Bars have ranged from 1.85¢ to 1.95¢, in carload lots, f.o.b. Chicago, according to specifications. Store prices may now be quoted 2.15¢ @ 2.30¢ for Common, the lower price being for large quantities.

Structural Iron.—Business has been rather quiet of late, the local trade being practically dead, and the outside demand for structural material having decreased considerably. Prices show no change.

Plates.—A few large orders that had been hanging for some time were placed during the past week. Store trade is also somewhat better. There is no change to note in the price of Iron or Steel Plates. Boiler Tubes are irregular in price, the rate fixed by the combination serving as a convenient basis to figure from, but being shaded according to circumstances.

Sheet Iron.—The jobbers have been in the market for supplies, and the consequence is that manufacturers' agents have recently booked some very nice orders. Some of the leading mills in the West are now out of the market, having secured all the orders they can fill for the season. The retail demand is only fair, without special feature. Prices for large lots are now firm, as there are fewer mills competing for business. Quotations are based on 3¢ at mill for carload lots of No. 27 Common, equal to 3.15¢ @ 3.17 1/2¢ on cars at Chicago. Store prices are still based on 3.40¢ for No. 27.

Galvanized Iron.—An active demand keeps warehouse stocks down to a low point. This is unusual for the time of year, and the local building trades were in full swing manufacturers' agents would have difficulty in supplying the quantity needed. Jobbers' quotations are unchanged at 50¢ and 15¢ discount for Juniata and 60¢ for charcoal.

Merchant Steel.—Some good orders for steel for special purposes have been placed during the week and store trade is also picking up. Prices are about as follows: Tool Steel, 7 1/2 @ 8¢; Specials, 12 1/2¢ @ 13¢; Self-Hardening, 40¢ @ 45¢; Spring, 3¢ @ 4¢; Open-Hearth and Bessemer Machinery, 2.8¢ @ 3¢; Crucible Machinery, 4 1/2¢ @ 5¢.

Steel Rails.—Few orders have been placed for some time, and prices are a little easier, \$42 being considered the present quotation. The Springfield Iron Company are now in the market, ready to take orders for August delivery. The other works in this vicinity are well filled until late in the fall. Very little has so far been done toward contracting for deliveries in 1888.

Scrap.—A few hundred tons of No. 1 Railroad Shop Scrap were sold during the week at \$21, and some small sales of Machinery Cast were made, but apart from these transactions very little business has taken place. Quotations for carefully selected Scrap are as follows, per ton of 2000 lb: Railroad Shop or No. 1 Forge, \$19 @ \$20; Railroad Track, \$17 @ \$18; Mill or No. 1 Wrought, \$15.50; Light or No. 2 Wrought, \$9.50; Boiler Plates, \$14.50; Pipes and Flues, \$13; Stove Plate, \$10.50; Machinery Cast, \$15; Cast Borings, \$9; Machine Turnings, \$12; Axle Turnings, \$13.50; Coil Steel, \$15; Leaf Steel, \$16.50; Locomotive Tires, \$19; Horseshoes, \$20; Axles, \$24.50; Mixed Country Wrought, \$13 @ \$14.

Old Rails and Wheels.—Sales of Old Iron Rails have been made at \$22, delivered at Milwaukee, and 1000 tons have been purchased at \$23, delivered at Chicago during July and August, as a speculative transaction. Car-Wheels are offered at \$21, but buyers only bid \$20.50.

Nails.—The local Nail market is gradually working into better shape. The demand is improving, and prices are gradually being toned up. Manufacturers are no longer selling at the very low prices recently reported, while some even ask full card rates. Jobbers prices range from \$2.20 to \$2.25 for Steel Nails in small lots, and \$2.10 @ \$2.15 for Iron Nails. The prices of Steel Nails are more firmly held than those of Iron Nails, as some jobbers are anxious to get rid of their stocks of the latter, and are offering them at low figures. Wire Nails are moving less actively from manufacturers' hands, but prices rule about the same as last week, jobbers selling at \$3.25 @ \$3.40, according to quantity.

Barb Wire.—As the time is now at hand when farmers are very busy harvesting, the demand is falling off, mills are catching up with their orders, and another week will end the pressure in this market for a supply of Barb Wire. Jobbers still quote 3.50¢ for Painted and 4.25¢ for Galvanized in small lots, with a slight concession for carloads.

General Hardware.—On all sides trade is reported to be unusually good for the season. One firm says they have never had such a large volume of sales since they have been in business. The only change reported in prices is in the case of Carriage Bolts, which have been advanced about 5¢, but a firmer tone is noted in Cutlery without as yet taking the shape of higher prices. The slight cutting in Bolts and Nuts reported some time ago has been confined to narrow limits, and has not resulted in a general upsetting of prices.

Lead.—About 300 tons of Pig were sold during the past week, for delivery in June and July, at 4.55¢. Very little is offering, either spot or futures.

Mr. W. E. Stockton, Nos. 16 and 18 West Lake street, Chicago, has taken the Western agency for Long & Co.'s High Test Rolled and Forged Irons. Messrs. Long & Co. are the proprietors of the Vulcan Forge and Iron Works, of Pittsburgh, and their products have attained a very high standing in the trade.

Messrs. H. R. Durkee & Co., No. 115 Dearborn street, Chicago, selling agents for the Globe Iron Company, of Jackson, Ohio, whose furnace was burned on the 15th inst., have been advised that the furnace will be immediately repaired and will be in active operation again within 60 to 90 days.

Pittsburgh.

Office of The Iron Age, 77 Fourth Avenue, PITTSBURGH, PA., June 21, 1887.

There has been no important change in the Iron situation during the past week. The mills are pretty generally in operation, although some of them, owing as much to the

Trade Report.

extremely hot weather as anything else, are only running single turn. Contrary to general expectation a week ago the coke strike still continues, the other operators refusing to follow in the wake of the Carnegies and pay the advance. Pig iron furnace men have, as is pretty well known, made a demand for cheaper coke, which the coke operators cannot grant if they are obliged to pay more for labor, and furnace men say that unless they do get cheaper coke, they will not start up their furnaces, even when the coke strike is over, claiming that the present condition of the iron business will not justify it. The wage scale of the iron workers for the coming year, to date from July 1, is in the hands of the Conference committees. Manufacturers are very emphatic in asserting that they will not pay the advance, but it is to be hoped that the committees will be able to arrive at an understanding between now and the 1st of July.

Pig Iron.—There has been little change in the general position of the market during the past week, with the exception that desirable irons are becoming a little scarce, and are held more firmly in consequence. The demand, in view of the possibility of a shut down next month, is light, and, besides, consumers generally take stock in July, and they want to close June with as little of the raw material on hand as possible. Consumption keeps up, while production is light, and until the coke strike is terminated the latter cannot be increased. The stock of iron has been steadily going down ever since or soon after the inauguration of the strike, and by the 1st of July the supply, especially of desirable qualities, will be down lower in this district than it has been for a number of years. However, consumers, for reasons already noted, are buying only as immediate necessities require, and the demand, therefore, is almost wholly for small lots, although it amounts to considerable in the aggregate. Holders of good irons are not as anxious to sell as they were some time ago, and, while the market is firmer, we make no change in quotations.

The last sales of Bessemer iron reported was at \$21.25 @ \$21.50, cash, at which the market may be quoted steady, with a fair demand and light supply.

Muck Bar.—The dullness noticed for some weeks past continues; there is no demand scarcely, and not enough doing to establish quotations. In the absence of sales we quote nominally at \$30 @ \$31 cash.

Manufactured Iron.—There is nothing new to note; business continues to keep up very well, more orders coming forward probably than a month ago, caused in part by an apprehension on the part of buyers of a strike next month, some of whom it would inconvenience to have their wants supplied elsewhere. Mill owners, with the possibility of a shut down in view, have been refusing to book orders for delivery beyond this month. Prices for first quality iron are still quoted upon a basis of 2¢ for bars, 60 days, 2¢ off for cash.

Nails.—There is no improvement in demand, and while it is hoped that there will be in July, the prospect at present is not as encouraging as it might be. Trade has been very disappointing all spring, and the market is badly demoralized. The factories here pretending to anything are not running half time, and the advices from Wheeling are of a similar character; some factories, it is reported, are not working over one third of the time. The great trouble with the nail business lies in the fact that the productive capacity is much in excess of the consumption. Prices may be quoted nominally at \$1.90 @ \$2.00, 60 days, 2¢ off for cash. The association price remains unchanged at \$2.25, but it has been a dead letter for some time past. The next monthly meeting of the association takes place in this city.

Wrought Iron Pipe.—This department of the iron business is also overdone and considerably demoralized. An adjourned meeting of the Pipe Association took place in this city last week, and from the fact that there was nothing done except to adjourn over until September, it is evident that the conference was not a very harmonious one. There was no action taken in regard to prices, hence, for the time, each firm will make their own rates, as has virtually been the case for some time past. Thus matters stand at present, and unless there is a special meeting called, which can be done at any time, there is not likely to be any change. While the association rates remain unchanged they are not being adhered to, and it is difficult to give reliable quotations in consequence.

Old Rails.—There is little or nothing doing, and not likely to be until next month. There appears to be a firmer feeling, and some operators predict higher prices before long. In the absence of sales we quote at \$24.50 for Tees and \$25.50 for Double Heads. Stocks in hands of consumers here are light, and in case there is no strike will have to be replenished next month.

Steel Rails.—So far as we can learn, there has been no business here of late, but both of the mills here are sold ahead. We continue to quote at \$39 @ \$40 cash at mill.

Billets, &c.—There is a fair business in Bessemer Billets, which may be quoted at \$30.50 @ \$31 cash. There is little or no inquiry for Nail Slabs, which in the absence of sales may be quoted nominally at \$30.50 @ \$31. Sales of Rail Ends at \$22 @ \$22.50 cash; Bloom Ends quoted at \$21 @ \$21.50. Foreign Billets and Slabs cannot be laid down here from the seaboard at prices above quoted for American, hence the former for the time are shut out of the market.

Railway Track Supplies.—There is little or no change to report; business fair, prices unchanged. Spikes, 2.75¢, 30 days, delivered; Splice Bars, 2.10¢ @ 2.20¢; Track Bolts, 2.20¢ @ 2.30¢ with Square and 2.35¢ @ 2.40¢ with Hexagon Nuts. There may and likely will be an improved demand later on in the summer, as the indications are that there will be a good deal of railroad building the last half of the year.

Old Material.—There is no improvement in the demand and not likely to be until next month. Prices are without quotable change. Sales: No. 1 Wrought Scrap at \$20.50 @ \$21.50, net; Wrought Turnings, \$16; Cast Axles, \$27 @ \$28; Cast Borings, \$13, gross; Cast Scrap, \$16.50 @ \$17; Railroad Leaf Scrap, \$24, net ton; Open-Hearth Steel, \$21 @ \$22, gross; Old Car Wheels, nominal at \$20 @ \$21, gross.

Chattanooga.

Office of The Iron Age, Carter and Ninth Sts., CHATTANOOGA, TENN., June 20, 1887.

The extremely hot weather that has prevailed for the past few days seems to have engendered a laxity of energy, and the greatest efforts that are now being made are to keep cool. Mountain springs and watering places are now more talked about than business, and the effect is, of course, a falling off somewhat in current trade. Crops of all kinds are looking remarkably well, and if the country is favored with occasional showers, the yield will be largely more than the average.

Pig Iron.—Prices remain about the same. When most of the furnaces are selling their entire output (off grades excepted), the feeling among buyers seems to have developed a disposition to purchase only for wants in the immediate future. Should the consumption continue to keep up with the supply, which appears now to be the case, there will be a continuation of the same condition of the market that now prevails, and prices will be maintained. There is one thing evident, however, so far as the capacity of the Southern furnaces is concerned, there is not going to be as much first-class iron turned out during the balance of the year as there has been in the past. Some of them occasionally bank for want of coke, and when they do start poor grades is the result. Some are taking occasion to reline and fix up, in the meantime to get in a stock of fuel and then go ahead again. The fact of it is the furnace capacity of the South is a long way ahead of the coke capacity. The Southern foundries that are employed principally on domestic work are having about all they can do. The many new enterprises that are located throughout the South have been a source of large trade for them, and there is scarcely one to be found that complains of dull times. The foundries that are running on specialties, such as Cotton Presses, Gins, Sugar Mills, &c., are now stocking up to be ready for the fall trade. Those furnaces that are running on Stoves, Flows, Water Pipe, &c., are also full of business. As an evidence of the diversity of our market we note shipments from this city alone to California, even as far as Los Angeles, of some 24 carloads of Pipe and Stoves within the last two months.

Cleveland.

CLEVELAND, June 20, 1887.

Iron Ore.—Exorbitant vessel rates are having their effect upon the markets. There is very little justice to any one in a \$2.50 rate from Ashland, with \$2 and \$1.60 as the ruling prices from Marquette and Escanaba. Vessel owners have practically settled upon these figures, and the buyers consequently suffer. There is nothing to justify these high freight rates, and purchasers of Ore are taking only small quantities. The heaviest sale reported during the past six days is that of a 5000-ton lot of Menominee Range Bessemer at about \$6. Gogebic Ores are still quoted at from \$5.50 to \$6 per ton. An especially fine lot of No. 1 Specular and Magnetic Bessemer sold during the week at \$7.05, but larger quantities have sold as low as \$6.75. The several thousand men on the Ore docks, who have been idle for a few weeks, will begin work to-morrow, the railway officials having agreed to the 25 cents advance asked. Ore will now be rushed forward to the furnaces at a lively sale. Only about 30,000 tons were shipped during the past week. There are no chances in quotations, Bessemer Hematites being still quoted at \$5.75 @ \$6, and the very best Specular Bessemer at \$6.50 @ \$7.

Pig Iron.—The market has not been particularly active, but there are additional indications of a better trade further on. The consumption is large, production is very light and stock piles are being reduced.

Prices are, therefore, very firm, although trade is quiet. Quotations, f.o.b. cars Cleveland, four months, are:

Nos. 1 to 6 Lake Superior charcoal, \$24.00 @ 24.50
No. 1 Strong Foundry, Bessemer quality, \$21.35 @ 21.85
No. 1 Strong Foundry, \$21.35 @ 21.85
No. 2 Strong Foundry, \$21.35 @ 21.85
No. 1 American Scotch, \$21.35 @ 21.85
No. 2 American Scotch, \$21.35 @ 21.85
No. 1 Soft Silvery, \$21.35 @ 21.85
Mahoning and Shenango Valley neutral Mill Irons, \$21.35 @ 21.85
Mahoning and Shenango Valley Red Short Mills, \$21.35 @ 21.85

Old Rails.—The market is dull and only occasional sales of Old Rails are reported. A nominal quotation is \$24. Old Wheels at \$21 are slightly more active.

Manufactured Iron.—Buyers are scarce and only a very light trade is reported. Bar Iron at \$2.10 has sold a little more freely than for a week or two in the past.

Nails.—Iron Nails do not go below \$2, or Steel Nails below \$2.10. At these figures the market shows more life than has been discernible for some time.

Detroit.

CHARLES HINCH & Co., dealers in Pig Iron, Detroit, Mich., report, under date of June 20, 1887, as follows: Since our last report a number of large consumers have been quietly placing orders for three or four months' delivery, and in some cases have been able to obtain a slight concession in price. There is a growing scarcity of Ohio Coke Irons, and small consumers are coming into the market for iron for immediate use. While there have been a few sales of Southern Silvers in this market at low figures, the majority of orders taken have been but little under former quotations. There is more inquiry for Lake Superior Charcoal than usual, and some large orders have been booked. Sellers are firmer than they have been, and unless some of the furnaces that are banded go into blast prices will undoubtedly take an upward turn very soon. Manufacturers prefer not to contract for delivery late this year at present quotations. The burning of the Globe Furnace, at Jackson, Ohio (makers of one of the best Jackson County Silvers), will effect this market, as they sold quite largely to consumers here. We quote the market to-day about as follows:

Lake Superior Charcoal, all numbers, \$23.00 @ \$24.00
Lake Superior Coke, All Ore, \$23.00 @ 24.00
Lake Superior Coke, Cinder Mixed, \$23.00 @ 24.00
Standard Ohio Blackbands, \$21.00 @ 24.00
Southern No. 2, \$19.25 @ 20.25
Southern Silvery, \$20.00 @ 21.00
Jackson County, Ohio Silvery, \$20.50 @ 21.50
American Old Iron Rails, \$23.50 @ 25.00
Old Wheels, \$20.00 @ 21.00

Louisville.

LOUISVILLE, KY., June 21, 1887.

Pig Iron.—The market continues without any material change. The inquiry from the interior is better, but the bulk of it is for small lots and short delivery, showing that most consumers are still adhering to the policy of buying for immediate wants only. During the last two or three weeks a great many of the off-lots of iron that were on the market at low prices have been picked up, and there is not so much of this description of iron offered. On the other hand, some few furnaces that have been behind in their deliveries are catching up, and are even offering some regular grades on the market, but there is no disposition on their part to press sales, but simply to meet the market at market prices. There still continue to be offered, however, some lots by parties who purchased in excess of their wants and parties who bought on speculation, and these have a tendency to depress prices, though we know of no holders who are willing to accept less than our inside quotations, and we know of no sales made under those quotations for standard irons. On the other hand, we know of one sale of No. 2 Mill made at a price a little above our outside quotations. This was for a high class of iron, and a brand that generally brings a little above the market. A good many consumers at interior points that usually buy their iron in June for the year have commenced to make inquiries for their season's supply. Inquiries made of furnaces for authority to sell these lots show no very large amounts offering, and a reluctance to contract six months ahead. Altogether the indications are that any considerable purchasing now would advance the market, but no indications of an advance have actually appeared. We quote for cash in round lots as below:

Southern Coke, No. 1 Foundry, \$20.50 @ \$21.00
" No. 2 " " " 19.00 @ 20.00
" No. 3 " " " 18.50 @ 19.00
Hanging Rock Coke, No. 1 Foundry, 19.00 @ 20.00
Southern Charcoal, No. 1 Foundry, 21.00 @ 22.00
Silver Gray, different grades, 17.50 @ 18.50
Southern Coke, No. 1 Mill, Neutral, 17.50 @ 18.00
" No. 2 " " " 17.00 @ 17.50
" No. 1 " " Cold Short, 17.50 @ 18.00
Charcoal, No. 1 Mill, 18.50 @ 19.50
White and Mottled, different grades, 16.00 @ 17.00
Southern Car-Wheel, standard brands, 25.00 @ 26.00
Southern Car-Wheel, other brands, 23.00 @ 24.00
Hanging Rock, Cold Blast, 25.00 @ 26.00
Hanging Rock, Warm Blast, 22.00 @ 23.00

W. B. BELKNAP & Co., Louisville, report as follows, under date of June 20, 1887: The market continues quite active and moderately firm in tone, despite the fact that raw stock is quoted lower in the great centers of production. There seems to be scarcely any speculation in the shape of iron, but what is much better—a steady buying for actual wants. The harvest season is now here, opening up in fine style, with a promise of handsome returns for the farmers. This is always good news to the merchant, who is bound to be well pleased if his country cousins are in a good humor. Bar Iron.—Sales have been quite free in jobbing lots at slight concessions from previous figures. A very little concession,

however, is all that is necessary to satisfy buyers, as their wants seem to be immediate and imperative.

Sheet Iron.—A demand for Light Sheets seems to have sprung up in moderate quantities very early in the season. Mills are firm in their asking price, and are not pushing sales to any extent.

Nails.—Continue so very low in price, but are not as much demoralized as they were a few weeks since. Most of the extreme figures have been withdrawn, and factories are now asking anywhere from 2½¢ to 10¢ more than they did two weeks ago. Consumption, however, does not seem to be so very heavy, and promise of much higher figures is met with more or less incredulity. Wire Nails are being sold more and more freely, and as they come into general use are subject to the same sharp competition in the market that Cut Nails enjoy; hence they are not a source of much profit to those who handle them.

Wire.—The demand for Barb Wire and fencing material generally is light, owing to the field work that is necessarily done at this time; at the same time prices are on a safe basis, and no decline is looked for, no matter how dull the article may be temporarily. There has been an immense amount of Screen Wire Cloth sold in this market this season, compared with any previous one. People hereabouts seem to be realizing for the first time the comfort of screened windows. The outlook is encouraging from every standpoint.

Cincinnati.

CINCINNATI, June 20, 1887.

Pig Iron.—There has been a fair volume of business during the past week, and although there have been some sales at very low prices they have been the exception rather than the rule, and the tendency has been toward a more confident if not a firmer feeling. It is claimed that stocks at the furnaces at present show scarcely two weeks supply at the present rate of consumption, and again that the two largest furnaces in the South are out of the market entirely—one on all grades, and the other on all but Silvery iron. There has been quite an active demand for Southern Car Wheel Iron, one lot of 3500 tons selling at \$25.00 for summer and fall delivery; 1000 tons of Southern Mill iron sold at \$18.10, thirty to sixty days time, and 2000 tons No. 2 Southern Foundry at \$19.75, cash. There has also been a fair run of small orders, and a few 500 and 600 ton lots, aggregating several thousand tons more. The trading in Silvery Gray and Bright Iron has been at about the prices current a week ago. Further sales of Locking Soft Iron are reported at prices which defy competition. Lake Superior Iron is said to be extremely weak. The current cash price for Pig Iron, f.o.b. cars at Cincinnati, are as follows:

Charcoal Foundry.
Hanging Rock, No. 1, \$23.00 @ \$24.00
Hanging Rock, No. 2, \$21.00 @ 22.50
Southern No. 1, \$21.00 @ 22.00
Southern No. 2, \$20.00 @ 21.00
Coal and Coke Foundry.
Ohio Soft Stonecoal, No. 1, \$20.00 @ 20.50
Ohio Soft Stonecoal, No. 2, \$19.00 @ 19.50
Southern Coke, No. 1, \$20.00 @ 20.50
Southern Coke, No. 2, \$19.50 @ 20.00
Southern Coke, No. 3, \$18.00 @ 19.00
Ohio and West Pennsylvania Coke, No. 1, \$21.00 @ 22.00
Ohio and West Pennsylvania Coke, No. 2, \$20.00 @ 21.00
Forge.
Strong Neutral Coke, \$18.00 @ 18.50
Hanging Rock, \$16.50 @ 17.00
Southern Coke, \$18.00 @ 19.00
Car-Wheel and Malleable Irons.
Southern Car-Wheel, \$25.00 @ 27.00
Hanging Rock, Cold Blast, \$26.00 @ 27.00
Hanging Rock, Warm Blast, \$24.00 @ 25.00
Lake Superior Malleable, \$24.00 @ 25.00

Old Rails and Wheels.—The demand for Old Wheels has continued active, and the supply light, with prices nominal at \$21.50 @ \$22. Old Rails have continued slow and easy, under free offerings, at \$23.50 per ton.

Nails.—The demand has been fair in a jobbing way, and the market has ruled steady without further change in prices. Iron, rod, to 60d., selling at \$2.10 ½ keg, and Steel at \$2.15 ½ keg, and other sizes at proportionate rates.

Manufactured Iron.—There has been a good demand and a firm market for all kinds. The local mills meet to-morrow to consider the change in the scale made by the ironworkers. It is the opinion that the scale will not be accepted by the mills in its present shape. We quote: Bar Iron, 2¢; Charcoal Bar Iron, 3¢; Sheet Iron, Boiled, Nos. 10 to 27, 2½¢ @ 3½¢; Sheet Iron, Charcoal, Nos. 15 to 25, 3½¢ @ 4½¢ ½ lb.

Old Metals, Rags, &c.

The purchasing prices offered by dealers are as follows:

Heavy Copper	.....	\$0.07
Light Copper	.....	..06
Copper Bottoms	.....	..06
Brass, Heavy	.....	..06
Brass, Light	.....	..04
Composition	.....	..04
Lead, Heavy	.....	\$0.03 ½
Tea Lead	.....	..04
Zinc	.....	..04 ½
Wrought Iron	.....	12.00 @ 13.00
Light Iron	.....	10.00 @ 11.00
Stove Plate Iron	.....	10.00 @ 11.00
Machinery Iron	.....	10.00 @ 11.00
Grate Bars	.....	7.00 @ 8.00
Old Rubber	.....	0.04 @ 0.05
White No. 1	.....	0.04 @ 0.05
White No. 2	.....	0.04 @ 0.05
Canvas, Linen, No. 1	.....	0.04 @ 0.05
Canvas, Cotton, No. 1	.....	0.04 @ 0.05
Canvas, No. 2	.....	0.04 @ 0.05
Seconds	.....	0.01 @ 0.02
Soft Woollens	.....	0.04 @ 0.07
Shred Rags	.....	0.01 @ 0.02
Junny Bagging, No. 1	.....	0.01 @ 0.02
Junny Bagging, No. 2	.....	0.01 @ 0.02
Book Stock	.....	0.005 @ 0.01
Newspapers	.....	0.005 @ 0.01
Waste Paper	.....	0.005 @ 0.01
Kentucky Bagging	.....	0.04 @ 0.05
Kentucky Bale Rope	.....	0.04 @ 0.05
Kentucky Bagging	.....	0.04 @ 0.05

New Additions to the Canadian Tariff.

The following additional changes in the pending revision of the Dominion tariff were made on June 14th, again modifying the duties of May 12th:

Brass in bars and bolts, drawn, plain and fancy tubing 10 per cent. ad valorem.

Nail plate of iron or steel, 16 gauge and thicker, \$13 per ton.

Chopping axes, \$2 per dozen, and 10 per cent. ad valorem.

Hay knives and four, five and six pronged forks of all kinds, \$2 per dozen, and 20 per cent. ad valorem.

Garden rakes, 5 cents each, and 25 per cent. ad valorem.

Shovels and spades, and shovel and spade blanks, \$1 per dozen, and 25 per cent. ad valorem.

Iron and steel wire, galvanized or not, 15 gauge and coarser, not elsewhere specified, 25 per cent. ad valorem.

Tinsmiths' tools, and harness makers' and saddlers' hardware, including curry-combs, 35 per cent. ad valorem.

Tubes not welded nor more than 1½ inches in diameter, of rolled steel.

Swedish rolled iron, nail-rod under ½ inch in diameter, for the manufacture of horse-shoe nails, 20 per cent. ad valorem.

Lap-welded iron tubing, threaded and coupled or not, 1½ inches in diameter and over, 20 per cent. ad valorem.

Flasks and vials of less capacity than 8 ounces, 30 per cent. ad valorem.

Boiler and other plate iron, reduced to \$13 per ton.

Rolled iron or steel angles, channels, structural shapes and special sections weighing less than 25 pounds per lineal yard, not elsewhere specified, ½ cent per pound, and 10 per cent. ad valorem.

Rolled iron or steel beams, girders, joists, angles, channels structural shapes and special sections, weighing not less than 25 pounds per lineal yard, 12½ per cent. ad valorem.

Rolled iron or steel beams, girders, joists, angles, channels and eyebars blanks made by the Kloman process, together with all other structural shapes of rolled iron or steel bridge-plate, not less than ¾ inch thick nor less than 15 inches wide, when imported by bridge manufacturers for use exclusively in the manufacture of iron and steel bridges, 12½ per cent.

Wrought-iron tubes, not otherwise specified, ½ cent per pound, and 30 per cent.

The undermentioned items shall be free of duty:

Wire of iron or steel, galvanized or tinned, number 16 gauge or smaller.

Fire bricks for all processes of manufacture.

Rolled rods of steel under ½ inch in diameter, or under ½ inch square, when imported by knob or lock manufacturers or cutlery for use exclusively in such manufactures in their own factories.

The Master Car Builders.—In the Master Car Builders' Association which was in session at Minneapolis, Minn., last week, the committee on accidents to trainmen reported that 4856 locomotives killed 217 and injured 1226 employees in the States of Massachusetts, New York and Michigan; 25,037 locomotives in the United States killed 1426 employees and injured 6548. Nearly one-half of these injuries came from coupling cars. The committee urge the necessity for the more rigid inspection of cars in the matter of steps, handles and railways, and recommends a standard for location, proportion and construction of such parts of cars. The committee on freight train brakes reported that the recent tests point to two conclusions—first, that the best type of brake for long freight trains is the one operated by air, but in which the valves are actuated by electricity; second, that this type of brake possesses four distinct advantages—first, it stops a train in the shortest possible distance; second, it abolishes shocks and its attending damages to equipment; third, it releases instantaneously; fourth, it can be graduated perfectly. The committee recommend that the subject of automatic freight train brakes be continued for further investigation. The association voted to meet at Alexandria, in the Thousand Islands, next year.

The Tyler Tube Mill, at Boston, went into operation last April, and since that time has been running constantly day and night. These are the only works in New England where lap-welded boiler tubes and pipe are manufactured. Their plant, which covers 2 acres of ground, is located alongside the N. Y. & N. E. Railroad, and is also directly opposite deep tidewater, thus affording every facility for shipping. The mills have a capacity of 500 tons, weekly, of tubes and pipe from 1½ to 10 inches in diameter, and 24 feet long, and were designed and erected by Messrs. Flagler & Fisher, of Boston. The furnaces are run by gas manufactured on the premises, and were designed and built by Jas. A. Harriek, 146 Kemble Building, New York. The first tube run was a perfect one, and the works were from the very start put on "double turn." Besides the latest improvements in manufacturing, the works have some special appliances and processes, covered by patents, which give them advantages for producing high grade goods. The works are under the personal supervision of John J. Fisher and Harvey K. Flagler, whose long experience is a practical guarantee of the class of work turned out.

Josiah Reamer, one of the oldest pig iron brokers of Pittsburgh, died on Friday last, after an illness of several months. Mr. Reamer represented Western furnaces chiefly, among others, Chickies and Rock Hill. Deceased was 60 years of age, a most estimable gentleman, and his death is deeply regretted by a large circle of relatives and friends.

A hearing has been granted for the 23d, by Judge Maynard, Assistant-Secretary of the Treasury, to representatives of the American Iron and Steel Association on the wire rod question.



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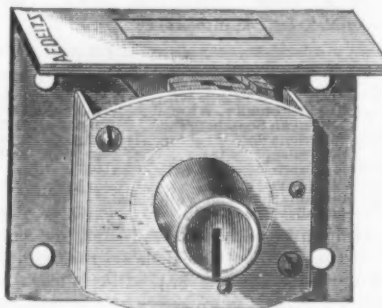
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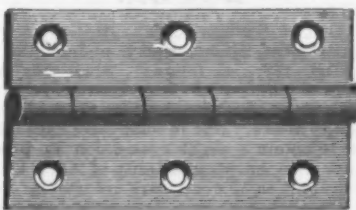
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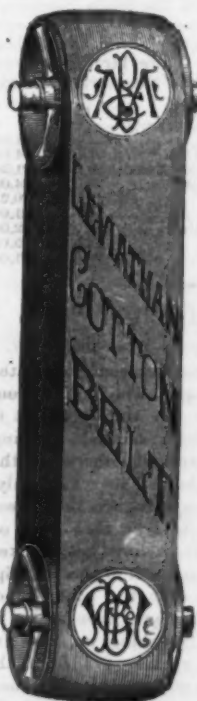
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Clings well to the Pulley.
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List of thirty different styles and sizes of Wringers.
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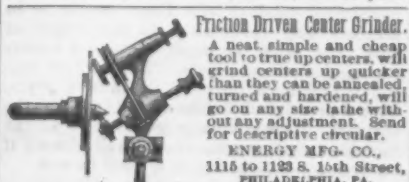
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have been used that they have not taken and held the market. They can be
sold for 10 Cents each, and that is less than the cost of filing a common
saw. They are so hard that one will cut three or four times as long as the
saws now in use without filing. As these Saws are not to be filed, and as
one only lasts a few months before getting dull, a great many of them are
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STAR BUTCHER ★ SAW BLADES.

Length.	Width.	Gauge.	Teeth to Inch.	Per Dozen.
14 and 16 in.	1/2 in.	24	9 1/2	\$1.08
18 " 20 "	3/4 "	24	9 1/2	1.20
22 " 24 "	1 " "	24	9 1/2	1.32



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Manufacturers of Stamped Brass, Silvered and Tin Goods, Hyatt's Patent Bram and Iron Spring Belts,
Bronze and Plated Thimbles, Roses, Plate Escutcheons, Socket Shells, &c., Mucilage Brushes, Patent
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We warrant these Faucets to be as represented,
measuring correctly and working more easily in
heavy molasses than any Measuring Faucet in the
market. No grocer can afford to be without them,
for they save time, and "time is money." They in-
sure perfect cleanliness, requiring no tin measures or
funnel to collect dirt and draw bits. They do not
drip. They prevent all waste, as no molasses or other
fluid can pass except when the crank is turned. They
are the embodiment of simplicity, and consequently
they are always in order. They work easily in the
heaviest molasses. They are warranted to measure
correctly, according to U. S. Standard.

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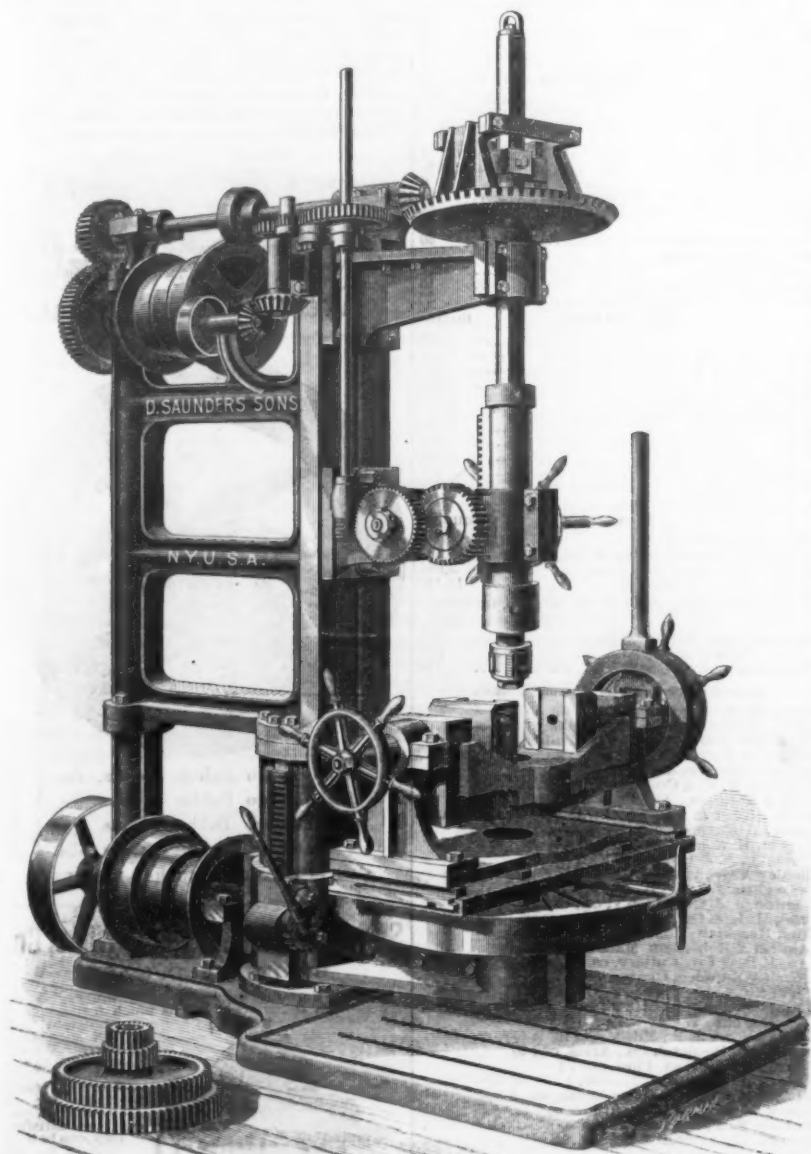
ALEXANDER BROS
BEST OAK BELTING
PHILADELPHIA.

MECHANICAL.

Machine for Tapping Steam and Gas Fittings.

D. Saunders' Sons, of Yonkers, N. Y., have brought out a new and improved form of their tapping machine for steam and gas fittings, its main features being shown in the annexed engraving. It is designed for much heavier work than the older machines built by the firm, being arranged to tap fittings for pipes up to 8 inches in diameter. It is also well adapted to tapping all the misc-

ellaneous articles used in steam and gas fitting. Having a round column and table, the latter can be easily raised, lowered, or swung out of the way, the rack for this purpose being at the side instead of in front, as in the earlier designs. Very large pieces of work can be placed under the drill. The space from center of spindle to column is 18 inches; frame, 7 feet high, permitting of the cone pulleys being put far enough apart to allow of a good length of belt, thus avoiding a difficulty common in such machines. Besides the variation of speed obtained by the cone pulleys, three pairs of gear wheels, which are very readily changed, will give almost any desired speed. The chuck for holding the fittings is strong and well fitted, and is provided with a compound movement, so as to permit of its self-adjustment to the line of the spindle. The spindle is counterbalanced, and the arrangement for moving it up and down is very convenient, being at the same time powerful and quick in its movement. It also has an attachment to the spindle for reducing the friction on same, which is very essential to a tapping machine. A self-feed also is attached when desired. The weight of the tool complete with chuck is 6800 pounds.



MACHINE FOR TAPPING STEAM AND GAS FITTINGS.

Built by D. Saunders' Sons, Yonkers, N. Y.

than 81 feet high, we may reduce its area below the collective area of the boiler-tubes in the same proportion that the square root of its height exceeds the square root of 81. For example, suppose we have to design a chimney for 10 boilers, 66 inches in diameter, each having 72 tubes, $3\frac{1}{2}$ inches in diameter, what would be its proportion? The collective area of the 720 $3\frac{1}{2}$ inch tubes would be 6017 square inches, and if the chimney is to be but 81 feet high, it should have this area, which would require a flue 6 feet $5\frac{1}{2}$ inches square, or if we made it circular, which would be preferable, its diameter would be 7 feet $3\frac{1}{2}$ inches. But suppose for some reason it is decided to have a chimney 150 feet in height, instead of 81 feet. The square root of 150 is 12.25; the square root of 81 is 9; and we reduce the area of the chimney by the following proportion: 12.25:9::6017:4420 square inches, which would be the proper area, and would call for a chimney 5 feet 6 inches square, or 6 feet 3 inches in diameter if round, and similarly if any other height were decided upon. As to the cross section of the chimney it may be said: for any given area of flue less bricks will be required if it is made circular, but for small stacks curved bricks will be required to make a neat job. Therefore it is best to build chimneys square, both inside and out up to a diameter of from 4 to 5 feet, larger sizes than this are better built round. There seems to be no good reason, except for architectural effect, for building a chimney square outside, and putting a round flue into it.

There is considerable difference of opinion as to what constitutes the best form of chimney flue in longitudinal section. Some make a chimney smallest at the top, some make it largest at the top, while others make several contractions and enlargements between the base and the top, with the idea, we suppose, of utilizing in an increased ratio whatever advantages may be possessed by either of the two preceding forms, without being sure which of them is tight. Others still make a contraction near the outlet, based on the principle of the *vena contracta*, or contracted vein, well known in hydraulics, but we must confess our inability to see any theoretical advantage in this case, for the contracted vein in both hydraulics and pneumatics occurs only where a fluid or gas flows through an orifice in a thin plate; where they flow through a long pipe, of such proportions as a boiler chimney, no contraction of the stream takes place at discharge. Therefore any contraction of the flue, no matter for what good purpose it may be intended, really diminishes the effective area of the flue. It has been found by many experiments that any sudden variations in the size of a pipe conveying water or gases, whether they are contractions or enlargements, simply add to the resistance to flow; therefore we can confidently assert our belief that no form of chimney flue pos-

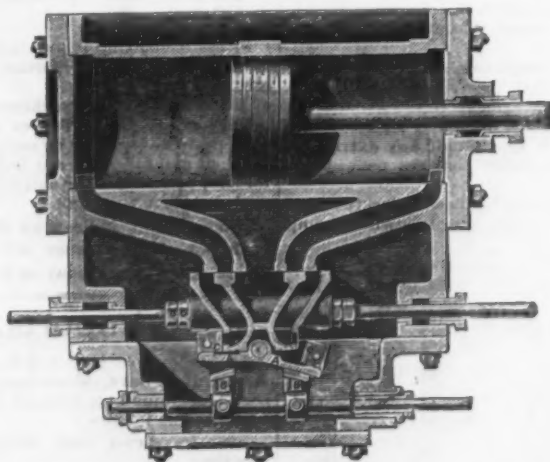
sesses any advantages over a plain, straight cylindrical flue. The main flue between the chimney and the individual flues leading from each boiler should always be designed according to this rule. Make it as nearly as possible equal to the area of the chimney or of the collective area of the tubes in the battery of boilers connected with it, run it as straight as possible from boilers to chimney, and where bends are unavoidable make easy turns instead of sharp right angles.

The number and form of the bends in a flue has great influences upon the draft. Bends are unavoidable: 1. Where the gases turn to enter the tubes at the back end of the boiler. This end of the tubes should be turned over and smoothly beaded down to facilitate the entrance of the gases. 2. Where the gases leave the front ends of the tubes and pass into the uptake. Bending the tubes at this end is not of so much consequence as it is at the rear end, but it does no harm, and can be recommended. 3. Where the gases leave the uptake and enter the main flue. The flow of the gases at this point may be facilitated by rounding the side of the uptake toward which the gases flow; but it is seldom done, and ordinarily it will not pay to do it. Also where the draft is strong and the main flue is small, division plates may be advantageously used to give direction to the outgoing current, and enable it to unite with the main current with less disturbance than would be the case without it. Where such a plate is used care should be taken that the plate does not project far enough into the main flue to interfere with the current flowing past. It should run clear across the flue, and its height should be just sufficient to make the lower segment of the flue cut off barely equal to the area of the uptake. A sharp right-angle bend should never be allowed in the main flue between the point where it leaves the battery of the boilers and the chimney. Where turns are unavoidable they should be made with as long a radius as is practicable. The current is enabled to pass around with scarcely any contraction, and consequently very little loss of *vis viva*. The fourth and last unavoidable bend occurs where the gases pass from the flue into the chimney. A sharp bend here is the almost universal exception. The chimney should always be rounded off above the flue. Much less resistance will be offered to the flow of the gases if this is done, and it costs nothing to do it. When two flues enter a larger one at right angles to it, and opposite to each other, as is frequently the case where there is a large number of boilers in a battery, and the chimney is placed near the center of the battery, the main flue should always have a division plate in its center between the two entering flues to give direction to the incoming currents of gases, and prevent their "butting" as it may be termed. This is a very important matter and should never be neglected. The same thing should always be done where two horizontal flues enter a chimney at the same height, at opposite sides.

The foregoing remarks relating to bends seem almost superfluous; they would not be offered were it not for the fact that the principles involved are persistently disregarded on every hand. Arrangements of flues and chimneys which are the best possible under the circumstances are the exception, not the rule. They are rare exceptions, too. We have in mind now a case where a pair of boilers were put in and a new chimney built for them. There was no earthly reason why a flue could not have been carried directly from the top of the uptakes to the chimney, but it was not done. The flue was dropped from the top of the setting down about 4 feet below the surface of the ground, thence sideways, away from the chimney about 6 feet, then upward about 2 feet, then horizontally through a mill foundation about 4 feet thick, then making a bend of about 45°, and run to the chimney cutting through the foundation of the same, and entering it from below. No chance whatever was left to clean out the flue, which was contracted in many places. As a matter of course, the draft is so poor that the steam made by both boilers is much less than one would easily furnish with proper flue connections.

The Tangye-Johnson Valve Gear.

We show in the annexed engraving a sectional view of an interesting form of valve gear, of English design, used on the engine



THE TANGYE-JOHNSON VALVE GEAR.

built by Messrs. Tangye, Limited, of Birmingham. It will be readily understood that the cut-off valve A, which travels with the main slide-valve, has an oscillating motion given to it by the cam B. The steam passes through the open end of the valve to the cylinder until the cam trips the cut-off valve and closes the open part, at the same time opening the closed part ready for the return stroke. The cut-off valve faces C are loosely fitted, so that on being brought in contact with the main valve the external steam pressure adjusts them to the face, and before it is necessary to break this contact steam enters by the under side of the main

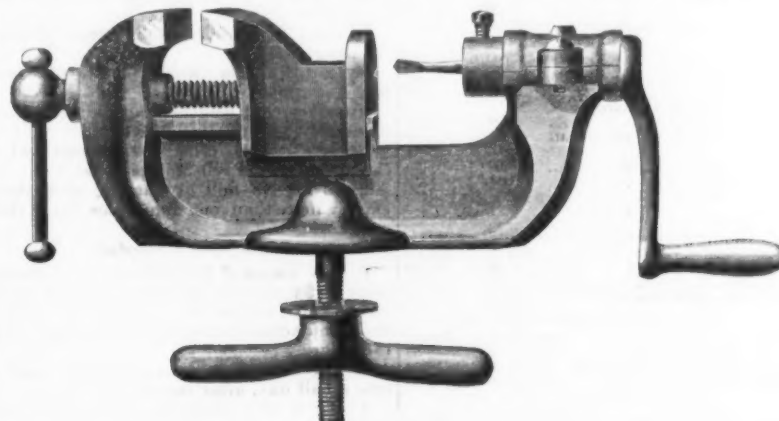
valve, puts them into equilibrium, and allows the valve to work freely. The governor determines the position of the cams.

A Curious Compound Engine.

A peculiar type of compound engine is illustrated and described in a recent issue of the *London Engineer*. The connecting-rod is a frame forming an isosceles triangle. One corner of the base is pivoted to one piston-rod; the other corner is coupled by a link carried in a slotted frame to the high-pressure piston-rod; the apex of the triangle makes the usual head for the crank pin; a single eccentric serves for the main valve of both cylinders. A gridiron expansion valve is worked on the back of the high-pressure valve automatically. We understand that several of these engines are at work in England, giving much satisfaction.

Combination Vise and Drill.

Strange's Machine Works, Taunton, Mass., have recently put on the market E. C. Strange's Combination Vise and Drill. It is represented in the annexed engraving, which indicates its construction and special features. It combines, it will be observed, a vise of the form indicated—and is described as well made, with finished jaws, sliding easily on the guides—and a horizontal or upright drill, as may be desired. Used as a vise or horizontal drill it is fastened to the bench or table by a thumb nut, being easily reversible so as to keep the desired end in position for use. If it is to be used as an upright drill it is fastened in a vertical posi-



STRANGE'S COMBINATION VISE AND DRILL.

tion to a post or stand with the drill end up. Size No. 2 is now ready, the weight being 5½ pounds, the length 9½ inches, the height 3¼ inches and the width of jaw 2 inches. It is described as substantially made of best material, every part fitted to standard, so that any piece accidentally injured can be duplicated. It is not only a useful tool for the machine shop, but also for the carpenter, wheelwright and many others, its features being such as to adapt it for general use.

Steam Waste Through Locomotive Whistles.

Commenting on some figures recently given concerning the waste of whistling, the *National Car and Locomotive Builder* for June says:

Through the kindness of Mr. Henry Schlacks, superintendent of motive power of the Illinois Central, we were recently permitted to make tests with a standard mogul locomotive belonging to the road, to see how fast steam passed out through the whistle. The annular opening of the whistle was $\frac{1}{4}$ inch wide, and the circle was $5\frac{1}{4}$ inches diameter, giving a total opening of $\frac{1}{4}$ of a square inch. The valve opening and size of pipe connection with the dome were simply sufficient to supply steam to fill this opening.

We commenced by blowing off the steam through the whistle from 130 pounds to 50 pounds gauge pressure, and noting the time consumed and fall of water in the glass for every 5 pounds of steam reduced on the gauge. It took 6 minutes and 50 seconds to reduce the steam from 130 to 100 pounds, and the water in the glass fell 1½ inches. When the blowing off was finished, we filled up the boiler to its original water level, and measured off sufficient to let the water fall again to the point where the steam was reduced to 100 pounds. This 1½

continuous whistling during the day, and the total quantity of coal used to make the steam would be 146 pounds. This is a good full average, for the whistle is seldom more than an instant kept full open in whistling, and that with which the experiments were made was kept full open all the time. The whistle was also of the largest size, both in regard to the length and width of the slot. The engines on the New York, New Haven and Hartford road that use up $\frac{1}{2}$ of a ton of coal daily in whistling for crossings, must make the welkin ring, as the whistle valve must be kept full open a total of seventeen minutes. That is a good deal of whistling for five or six hours of running. The actual quantity of steam that passed through the whistle opening in the experiment was less than half the quantity that ought to pass through a 0.8 of a square inch opening with the pressure of steam used. But the obstruction of the valve between the body of steam in the boiler and the kind of opening that the steam has to pass through, probably acts to reduce the natural velocity of the steam, so that the volume passed out of the boiler is much smaller than theoretical calculations would make it out to be.

Origin of the Indicator.

The origin of the steam-engine indicator is not clearly upon record. That Watt knew of and used it in a more or less completed form is certain, but whether he originated it or not is problematical. In the following description of the instrument, from his own pen, for which we are indebted to the Boston

Journal of Commerce, it will be seen that he does not directly claim it as an invention of his own. The instrument was, of course, designed for use upon engines in which the work was nearly all done at or below the atmospheric pressure, and were graduated by the use of the barometer quiescent.

About the first authentic allusion to the indicator which we have been able to find, says the *Journal*, is an appendix written by Mr. Watt to the article upon the steam engine in Robinson's "Mechanical Philosophy," published in 1822, in which the indicator is referred to as follows:

The barometer being adapted only to ascertain the degree of exhaustion in the condenser where its vibrations are small, the vibrations of the mercury rendered it very difficult, if not impracticable, to ascertain the state of exhaustion of the cylinder at the different periods of the stroke of the engine. It became, therefore, necessary to contrive an instrument for that purpose that should be less subject to vibration, and should show nearly the degree of exhaustion in the cylinder at all periods. The following instrument, called the indicator, is found to answer the end sufficiently:

A cylinder about 1 inch in diameter and 6 inches long, exceedingly truly bored, has a solid piston accurately fitted to it so as to slide easy by the help of some oil. The stem of the piston is guided in the direction of the axis of the cylinder so that it may not be subject to jam or cause friction in any part of its motion. The bottom of this cylinder has a cock and small pipe joined to it, which, having a conical end, may be inserted in a hole drilled in the cylinder of the engine near one of the ends, so that by opening the small cock a communication may be effected between the inside of the cylinder and the indicator.

The cylinder of the indicator is fastened upon a wooden or metal frame more than twice its own length; one end of a spiral steel spring, like that of a spring steel yard, is attached to the upper end of the frame, and the other end of the spring is attached to the upper end of the piston rod of the indicator. The spring is made of such strength that when the cylinder of the indicator is perfectly exhausted the pressure of the atmosphere may force its piston down within an inch of the bottom. An index being fast to the top of its piston-rod, the point where it stands when quite exhausted is marked from an observation of a barometer communicating with the same vessel, and the scale divided accordingly.

Single Exhaust Nozzles for Locomotives.

According to the *National Car and Locomotive Builder* Mr. Robert Colville, master mechanic of the Chicago, Burlington and Quincy Railroad, at Galesburg, Ill., has been experimenting with single nozzles for locomotives having the extension front and high exhaust pipe, with very great success. His first experience in this line was with an engine of the eight-wheel type, with cylinders 17 x 24 and the standard boiler. He first tried a nozzle $4\frac{1}{4}$ inches diameter, and found that the engine did not steam any too freely. Instead of closing up the nozzle he began experimenting with the deflector over the flues, and having got that of the proper size and in the correct position, the engine steamed very freely, so freely, indeed, that he was induced, step by step, to increase the size of nozzle to $5\frac{1}{4}$ inches. When he reached this point he found that the nozzle was too large. It was then reduced to $5\frac{1}{8}$ inches diameter, and the engine is now running with that nozzle very successfully and steaming freely. The engine has a very soft exhaust, throws no sparks, and is noted for light fuel consumption.

The Iron Scale as Proposed by the Men.

(Concluded from page 17.)

12 inch, guides, pair.....	\$2.00	5.50
12 inch, bull-heads, pair.....	18.00	2.50
12 inch, bull-heads for regular hoop mill.....	18.00	1.75
Pinions, set.....	7.00	

Ten-Inch Train.

Length.....	New Dressing.....	
38 inch, roughings, set.....	\$48.00	\$10.00
38 inch, flats, pair.....	30.00	3.75
28 inch, rounds and squares, soft, pair.....	31.00	5.00
28 inch, rounds and squares, chill, pair.....	70.00	18.00
28 inch, strands, all chill, set.....	90.00	6.00
28 inch, strands, all soft, set.....	42.00	6.00
28 inch, strand hoops, soft set.....	45.00	7.00
28 inch, edging, pair.....	35.00	6.00
12 inch, guides, pair.....	20.00	2.75
12 inch, bull-heads, pair.....	30.00	2.00
12 inch, bull-heads for regular hoop mill.....	30.00	2.00
Pinions, set.....	8.00	

Twelve-Inch Train.

42 inch, roughings, set.....	\$35.00	\$12.00
34 inch, flats, pair.....	34.00	4.00
34 inch, rounds and squares, soft, pair.....	135.00	20.00
34 inch, rounds and squares, chill, pair.....	36.00	5.00
34 inch, strands, all soft, set.....	60.00	6.00
34 inch, edging, pair.....	90.00	15.00
14 inch, guides, pair.....	40.00	8.00
14 inch, bull-heads, pair.....	42.00	3.50
Pinions, pair.....	6.00	

Fourteen-Inch Train.

48 inch, roughings, pair.....	50.00	8.00
38 inch, flats, pair.....	30.00	4.00
38 inch, rounds and squares, soft, pair.....	40.00	5.00
38 inch, rounds and squares, chill, pair.....	150.00	22.00
16 inch, guides, pair.....	28.00	4.00
Pinions, pair.....	7.00	

Fifteen and Sixteen Inch Train.

60 inch, roughings, pair.....	55.00	10.00
40 inch, flats, pair.....	38.00	4.00
40 inch, rounds and squares, soft, pair.....	45.00	6.00
40 inch, rounds and squares, chill, pair.....	190.00	25.00
18 inch, guides, pair.....	35.00	5.80
Pinions, pair.....	8.00	

RAIL TRAIN.

42 inch, finishings, set.....	\$17.00	\$15.00
60 inch, roughings, set.....	180.00	12.00
60 inch, tops and bottoms, set.....	80.00	8.00
36 inch, break-downs, set.....	55.00	8.00

Eighteen-Inch, Three-High.

54 inch, finishings, set.....	\$185.00	\$18.00
60 inch, roughings, set.....	140.00	14.00
60 inch, tops and bottoms, set.....	85.00	10.00
36 inch, break-downs, set.....	60.00	10.00

Twenty-Inch, Three-High.

72 inch, finishings, set.....	\$170.00	\$30.00
72 inch, roughings, set.....	150.00	15.00
60 inch, tops and bottoms, set.....	90.00	10.00
36 inch, break-downs, set.....	65.00	10.00

Twenty-four-Inch, Three-High.

54 inch, finishings, set.....	\$190.00	\$22.00
72 inch, roughings, set.....	160.00	16.00
60 inch, tops and bottoms, set.....	100.00	10.00

PLAIN CHILL.

12 inch, pair.....	\$25.00	\$4.15
24 inch, pair.....	30.00	5.00
30 inch, pair.....	35.00	5.80
36 inch, pair.....	42.00	7.00
42 inch, pair.....	50.00	8.25
48 inch, pair.....	58.00	9.50
54 inch, pair.....	68.00	11.55

Fourteen-Inch Trains.

18 inch, pair.....	\$30.00	\$5.00
24 inch, pair.....	35.00	5.80
30 inch, pair.....	40.00	6.65
36 inch, pair.....	47.00	7.85
42 inch, pair.....	55.00	9.15
48 inch, pair.....	63.00	10.40
54 inch, pair.....	72.00	12.15

Eighteen-Inch Trains.

24 inch, pair.....	\$30.00	\$5.00
30 inch, pair.....	35.00	5.80
36 inch, pair.....	40.00	6.65
42 inch, pair.....	47.00	7.85
48 inch, pair.....	55.00	9.15
54 inch, pair.....	63.00	10.40
60 inch, pair.....	72.00	12.15

Twenty-Inch Trains.

30 inch, pair.....	\$40.00	\$6.85
36 inch, pair.....	45.00	7.70
42 inch, pair.....	50.00	8.55
48 inch, pair.....	55.00	9.40
54 inch, pair.....	60.00	10.25
60 inch, pair.....	65.00	11.10

Twenty-four-Inch Trains.

36 inch, pair.....	\$40.00	\$6.85
42 inch, pair.....	45.00	7.70
48 inch, pair.....	50.00	8.55
54 inch, pair.....	55.00	9.40
60 inch, pair.....	60.00	10.25
66 inch, pair.....	65.00	11.10

Twenty-eight-Inch Trains.

42 inch, pair.....	\$40.00	\$6.85
48 inch, pair.....	45.00	7.70
54 inch, pair.....	50.00	8.55
60 inch, pair.....	55.00	9.40
66 inch, pair.....	60.00	10.25
72 inch, pair.....	65.00	11.10

Thirty-Inch Trains.

48 inch, pair.....	\$40.00	\$6.85
54 inch, pair.....	45.00	7.70
60 inch, pair.....	50.00	8.55
66 inch, pair.....	55.00	9.40
72 inch, pair.....	60.00	10.25
78 inch, pair.....	65.00	11.10

Thirty-four-Inch Trains.

54 inch, pair.....	\$40.00	\$6.85
60 inch, pair.....	45.00	7.70
66 inch, pair.....	50.00	8.55
72 inch, pair.....	55.00	9.40
78 inch, pair.....	60.00	10.25
84 inch, pair.....	65.00	11.10

Thirty-eight-Inch Trains.

60 inch, pair.....	\$40.00	\$6.85
66 inch, pair.....	45.00	7.70
72 inch, pair.....	50.00	8.55
78 inch, pair.....	55.00	9.40
84 inch, pair.....	60.00	10.25
90 inch, pair.....	65.00	11.10

Forty-Inch Trains.

66 inch, pair.....	\$40.00	\$6.85
72 inch, pair.....	45.00	7.70
78 inch, pair.....	50.00	8.55
84 inch, pair.....	55.00	9.40
90 inch, pair.....	60.00	10.25
96 inch, pair.....	65.00	11.10

Forty-four-Inch Trains.

72 inch, pair.....	\$40.00	\$6.85
78 inch, pair.....	45.00	7.70
84 inch, pair.....	50.00	8.55
90 inch, pair.....	55.00	9.40
96 inch, pair.....	60.00	10.25
102 inch, pair.....	65.00	11.10

Forty-eight-Inch Trains.

78 inch, pair.....	\$40.00	\$6.85
84 inch, pair.....	45.00	7.70
90 inch, pair.....	50.00	8.55
96 inch, pair.....	55.00	9.40
102 inch, pair.....	60.00	10.25
108 inch, pair.....	65.00	11.10

Fifty-Inch Trains.

84 inch, pair.....	\$40.00	\$6.85
90 inch, pair.....	45.00	7.70
96 inch, pair.....	50.00	8.55
102 inch, pair.....	55.00	9.40
108 inch, pair.....	60.00	10.25
114 inch, pair.....	65.00	11.10

Fifty-four-Inch Trains.

90 inch, pair.....	\$40.00	\$6.85
96 inch, pair.....	45.00	7.70
102 inch, pair.....	50.00	8.55
108 inch, pair.....	55.00	9.40
114 inch, pair.....	60.00	10.25
120 inch, pair.....	65.00	11.10

Fifty-eight-Inch Trains.

96 inch, pair.....	\$40.00	\$6.85
102 inch, pair.....	45.00	7.70
108 inch, pair.....	50.00	8.55
114 inch, pair.....	55.00	9.40
120 inch, pair.....	60.00	10.25
126 inch, pair.....	65.00	11.10

Sixty-Inch Trains.

102 inch, pair.....	\$40.00	\$6.85
108 inch, pair.....	45.00	7.70
114 inch, pair.....	50.00	8.55
120 inch, pair.....	55.00	9.40
126 inch, pair.....	60.00	10.25
132 inch, pair.....	65.00	11.10

Sixty-four-Inch Trains.

108 inch, pair.....	\$40.00	\$6.85
114 inch, pair.....	45.00	7.70
120 inch, pair.....	50.00	8.55
126 inch, pair.....	55.00	9.40
132 inch, pair.....	60.00	10.25
138 inch, pair.....	65.00	11.10

Sixty-eight-Inch Trains.

114 inch, pair.....	\$40.00	\$6.85
120 inch, pair.....	45.00	7.70
126 inch, pair.....	50.00	8.55
132 inch, pair.....	55.00	9.40
138 inch, pair.....	60.00	10.25
144 inch, pair.....	65.00	11.10

Seventy-Inch Trains.

120 inch, pair.....	\$40.00	\$6.85
126 inch, pair.....	45.00	7.70
132 inch, pair.....	50.00	8.55
138 inch, pair.....	55.00	9.40
144 inch, pair.....	60.00	10.25
150 inch, pair.....	65.00	11.10

Seventy-four-Inch Trains.

126 inch, pair.....	\$40.00	\$6.85
132 inch, pair.....	45.00	7.70
138 inch, pair.....	50.00	8.55
144 inch, pair.....	55.00	9.40
150 inch, pair.....	60.00	10.25
156 inch, pair.....	65.00	11.10

Seventy-eight-Inch Trains.

132 inch, pair.....	\$40.00	\$6.85
138 inch, pair.....	45.00	7.70
144 inch, pair.....	50.00	8.55
150 inch, pair.....	55.00	9.40
156 inch, pair.....	60.00	10.25
162 inch, pair.....	65.00	11.10

Eighty-Inch Trains.

138 inch, pair.....	\$40.00	\$6.85
144 inch, pair.....	45.00	7.70
150 inch, pair.....	50.00	8.55
156 inch, pair.....	55.00	9.40
162 inch, pair.....	60.00	10.25
168 inch, pair.....	65.00	11.10

Eighty-four-Inch Trains.

144 inch, pair.....	\$40.00	\$6.85
150 inch, pair.....	45.00	7.70
156 inch, pair.....	50.00	8.55
162 inch, pair.....	55.00	9.40
168 inch, pair.....	60.00	10.25
174 inch, pair.....	65.00	11.10

Eighty-eight-Inch Trains.

150 inch, pair.....	\$40.00	\$6.85
156 inch, pair.....	45.00	7.70
162 inch, pair.....	50.00	8.55
168 inch, pair.....	55.00	9.40
174 inch, pair.....	60.00	10.25
180 inch, pair.....	65.00	11.10

Ninety-Inch Trains.

156 inch, pair.....	\$40.00	\$6.85
162 inch, pair.....	45.00	7.70
168 inch, pair.....	50.00	8.55
174 inch, pair.....	55.00	9.40
180 inch, pair.....	60.00	10.25
186 inch, pair.....	65.00	11.10

Ninety-four-Inch Trains.

162 inch, pair.....	\$40.00	\$6.85
168 inch, pair.....	45.00	7.70
174 inch, pair.....	50.00	8.55
180 inch, pair.....	55.00	9.40
186 inch, pair.....	60.00	10.25
192 inch, pair.....	65.00	11.10

Ninety-eight-Inch Trains.

168 inch, pair.....	\$40.00	\$6.85
174 inch, pair.....	45.00	7.70
180 inch, pair.....	50.00	8.55
186 inch, pair.....	55.00	9.40
192 inch, pair.....	60.00	10.25
198 inch, pair.....	65.00	11.10

SAND ROLLS PLAIN.

40 inch, 18 inch trains, pair.....	30.00	6.00
60 inch, 18 inch trains, pair.....	40.00	6.50
54 inch, 20 inch trains, pair.....	42.50	7.00
60 inch, 20 inch trains, pair.....	45.00	7.50
66 inch, 20 inch trains, pair.....	50.00	8.30
60 inch, 22 inch trains, pair.....	50.00	8.30
66 inch, 22 inch trains, pair.....	55.00	9.15
72 inch, 22 inch trains, pair.....	60.00	10.00

CONTINUOUS TRAINS.

Turning, per pair.....	\$10.00
Dressing, per pair.....	1.00

Rules.

RULE 1. All kinds of shape or fancy iron double price of flat.

RULE 2. All kinds of alterations by the day, at the rate of fifty cents per hour.

RULE 3. Three-high roll one-half over the price of two-high.

RULE 4. A dressing consists of a light cut all over the rolls, not to exceed $\frac{1}{8}$ inch reduction in diameter of Sand rolls, nor more than $\frac{1}{16}$ inch reduction in diameter of Chill rolls; should a roll require cutting down, to be charged by the day, at the rate of fifty cents per hour.

RULE 5. Roll turners have to guarantee their rolls to work satisfactory; if any alteration is needed, the Turner must do it at his own expense, unless it can be proved satisfactory between the Superintendent and the Turner that the fault does not lay on the roll.

RULE 6. Should a Roll Turner spoil a roll, the firm can make him pay the price of the casting, besides losing his labor.

RULE 7. Roll Turners have to furnish compasses, calipers, straight edge, and plugs, from $\frac{1}{4}$ to $1\frac{1}{2}$ inch, all other tools to be furnished by the firm.

RULE 8. The firm have to furnish all help to change rolls.

RULE 9. Outside work one-third over price for power.

RULE 10. Odd lengths and diameters so much per inch, in proportion.

RULE 11. Steel rolls and pinions twice the price of sand rolls and pinions.

THE WEEK.

The boom in real estate throughout the West has lost something of the unprecedented impetus of a month ago, but, according to St. Louis authority, it has not by any means reached the point of reaction. There is still a steady and healthy tendency toward higher prices, and the volume of investments continues to be larger than has been known in any previous year.

Gov. Hill has approved the bill forbidding the use of stoves or furnaces in passenger cars.

Slavery in Brazil seems destined to speedy extinction. In 1871 a law was passed in the Brazilian Chambers or Parliament providing for the gradual emancipation of all the slaves in the empire. Such slaves as were not registered by a certain date were to be declared free by the terms of the law. There were then about 2,000,000 slaves in the country. In 1885 the number of registered slaves was found to be not greater than 1,200,000. At the opening of the Chamber in May, Alfonso Celso, a prominent member, and son of a former premier of the same name, offered a bill for the immediate freeing of the remaining slaves, which, at last accounts, was being earnestly discussed. Whatever the result, slavery in Brazil is believed to be near its end.

"The return of vessels lost or missing at sea furnishes a most terrible record," says the *St. James's Gazette*. "In the four years from the 1st of January, 1880, to the 31st of December, 1883, 1266 vessels foundered or were reported as missing, with a total loss of 6661 lives. The record for the 11 years 1873-83 shows a loss of 3153 ships, and no fewer than 17,157 lives. An extraordinary fact with regard to these figures is the large excess in loss of life in the vessels reported as missing in comparison with that of the ships known to have foundered. It is clear that nearly six-sevenths of the loss of life is in vessels which have disappeared without the ken of mortal man."

A lively business is reported at the various mill ports on Puget Sound. The wharves are crowded with coal and lumber vessels. The demand for lumber is quite active, especially for Australia, South America, Mexico, China, and other foreign markets. Sixty vessels arrived for cargoes in May, 53 were loaded in that month, and 70 were loading or waiting for cargoes at the close. Two steamers for ports in Alaska in May took merchandise to the value of \$100,000, and others for San Francisco and other domestic ports shipped merchandise during the month to the value of \$544,000.

The value of the lumber exported by Canada from 1873 to 1886, inclusive, exceeds \$310,000,000. Of this amount the United States bought about \$110,000,000 worth, while the exports to Great Britain were valued at about \$177,000,000. But the United States, in spite of a prohibitory revenue tax of \$2 per 1000 feet, is gradually becoming Canada's chief market. In years prior to 1880 Great Britain's purchase of lumber exceeded that of the United States from Canada by over \$12,000,000, while in 1885 Great Britain purchases amounted to \$9,577,581, against \$9,355,581 by the United States. Last year the export of lumber to the United States from Ontario and Quebec was valued at \$8,662,237. In comparison with this amount the exports of the other provinces were very small. According to a member of Parliament from New Brunswick, the lumber business of that province is now practically in the hands of Americans, as the mills at the mouth of the St. John's River are owned by Americans, who ship the product over the border.

San Francisco claims to have at the present time a population of something like 334,000, or an increase of 100,000 since the federal census was taken seven years ago, and she calculates that three years hence a city larger than any in the State, outside of San Francisco, nay, larger than any other on the coast—larger than Portland, Los Angeles, Sacramento, Oakland—as large as Los Angeles and San Diego together, will have been added.

Since the recent sale of surface railroad franchises in this city on terms providing large revenues for the municipal treasury, the Corporation Counsel is more than ever convinced that elevated railroads and electrical companies should be made to pay. In an argument before the Rapid Transit Commissioners it was contended that the elevated railroads should be compelled to pay at least 5 per cent. of their gross receipts to the city as compensation for a franchise to extend their lines to the ferries, or, if this could not be done on the main lines which are already in operation, that they be compelled to pay 45 per cent. of the gross receipts of such extensions. In 1875, when the first elevated road began to run, it carried 920,000 passengers and collected \$92,000, but in 1886 the number of passengers increased to over 115,000,000 and the receipts to over \$7,330,000; while this year, even with the fare reduced to five cents, the receipts promise to be over \$8,000,000.

The Canadian Government has ordered the removal of tolls on grain passing through the Welland Canal.

Seattle, Ore., where steamers bound to Alaska generally lay in their stores, has a population of about 10,000 people, and they are wide awake to the interests and pro-

perity of their city. It has a number of small steamers which trade at various points in Puget Sound and up the rivers which empty into it, bringing in business and adding to its commerce. There are three coal mines back in the interior 23 to 27 miles connected by rail with the water front. These supply both Seattle and Tacoma with fuel and large quantities for shipment. There is said to be an abundance of iron ore within 50 miles in process of being developed, and destined to add largely to the prosperity of both cities. Victoria, British Columbia, has a population of about 9000, and seems to be growing.

Canal and lake commerce is booming. The *Albany Argus* says: "The canals have again shown an increase in the amount of tonnage over the corresponding time last year. The report of Superintendent Shanahan, for the first week in June, shows an increase of 7480 tons when compared with the first week in June last year. The remarkable fact is exhibited, however, that of the total number of bushels of grain shipped from Buffalo the canals carried from Buffalo alone 1,305,881 bushels of wheat, 423,320 bushels of corn; total, 1,729,201 bushels; while all the railroads from Buffalo, for the same time, only carried 267,000 bushels of wheat, 357,050 bushels of corn; total, 624,050 bushels—the canal carrying 1,105,151 bushels in excess of all the railroads from Buffalo combined." The *Chicago Times* says: "The east-bound officials are considerably exercised over the decided drift of all kinds of freight to the lake lines. Last year the lake vessels began to make inroads upon the provision traffic, taking out large quantities of lard, and, notwithstanding the fact that the rail lines offered heavy concessions below the established tariff rates, the bulk of the business went by water. This year the same thing is being repeated to an aggravating degree, for not only do provisions continue to seek this channel of transportation, but other classes of traffic which have heretofore been considered as secure for the all-rail routes beyond peradventure are being taken by the boats."

Minister Pratt, at Teheran, in a recent dispatch to the Department of State, speaking of the desire frequently expressed to him by American firms to enter into trade relations with Persia, suggests that as there are no American houses doing business in Teheran, those who contemplate entering the Persian markets should be represented on the spot, either singly or collectively, by agents sent out for that purpose. His belief is that such an enterprise would result favorably to our home manufactures. Among the articles mentioned as most likely to meet with ready sale are hardware, sewing machines of low price and ordinary mechanics' tools.

All the machine shops of the country are full of orders, and have excellent prospects for the rest of the year. California potatoes next year will compete with Bermuda in the New York market, in consequence of the establishment of a freight rate of \$1 per cwt. on the fast vegetable train.

The New York "hog ring," it is alleged, have for some months conspired to regulate prices in New York and to manipulate quotations furnished to the press, in order to deceive buyers as to the actual state of the market. The pool is now on the brink of disruption. Nearly half of the most prominent firms in the business have organized "The New York Slaughtering Company," and leased their premises to go into the shipping of hogs from the West and slaughtering them for their own use and the city trade, as they say they cannot be at the mercy of this New York and Chicago hog ring any longer and continue business in this city. It is expected that cutters in New York and Brooklyn will all co-operate as soon as plans are completed.

The Chilean Government will award a prize of \$1000 for the best flax machine at the exhibition in Santiago, to open November 1.

Denver is to have a hotel to cost \$1,229,000. It will be of stone and brick, with a front of 293 feet, and be called the Metro fole, after the famous hostelry in London.

Another route from Kansas City to the Gulf of Mexico is promised by the Atchison, Topeka and Santa Fé Railroad Company, who are said to contemplate establishing a line of steamers between Galveston and Liverpool.

The clerical press in Mexico vehemently assails the Government on account of concessions made by the Diaz Administration to citizens of the United States. The *Nacional*, published at the capital, declares that these business men and financiers who are invading the country "will create American interests, will make themselves the owners of great manufacturing, mining, railway and agricultural enterprises, will acquire extensive territorial properties, will exercise by their wealth decisive influence in the country, and the day will arrive if things go on as they are now going when they will control the elections, will become deputies and ministers, and will decide who shall be President of the Republic." The writer sees in the future nothing but "Yankee absorption," the disappearance of the Mexican race in misery and an increase in the number of stars in the American flag.

One of the riotous strikers on the Missouri Pacific Railroad named Henry Homing, who last April shot Richard Town-

send, a deputy sheriff guarding a coal train, was tried before a jury at Fort Worth, and found guilty of murder in the first degree, and sentenced to the penitentiary for life. The defence was that the officers fired first.

The cotton and sugar crops of Louisiana promise better than for many years.

Business on the lakes thus far in the season has been highly remunerative to vessel owners. The average rates for the month of May are the best since 1881. By lake from Chicago to Buffalo, the average was 3 cents for wheat, and 2.7 cents for corn, and by barrel from Buffalo to New York, 6.7 cents for wheat, and 5.8 cents for corn.

The dock trials of the machinery of the cruiser Chicago just finished resulted satisfactorily. With the vessel fast at her dock each set of engines developed 1500 horsepower, with 53 revolutions per minute of the screws. This is equivalent to about 4000 combined horse-power, with the same number of revolutions when the vessel is running free. The contract requirement is 5000 horse-power, but, as the steam pressure during the trial was considerably below the maximum, it is believed that the necessary increase can be obtained.

A mail train on the Pennsylvania Railroad is reported to have been run successfully with no other fuel than crude petroleum, and arrived on time at Pittsburgh from Altoona on Friday night. Experiments have been progressing under the Pennsylvania Railroad auspices at Altoona, but this is the first time the long run to Pittsburgh has been attempted with only oil for fuel. The process is the invention of a Russian scientist and Dr. Dudley, of the Altoona shops.

The Metropolitan Trust Company have purchased the property 37 and 39 Wall street for a price stated to be \$450,000. The buildings were erected a few years ago for the Queen's Fire Insurance Company.

The Toronto Board of Trade, after a protracted debate, adopted resolutions almost unanimously in favor of "the largest possible freedom of commercial intercourse between Canada and the United States compatible with our relations with England." Prof. Goldwin Smith did not believe that Canada would be in any danger of estrangement from England by the consummation of commercial union. In such an event, according to other speakers, the advantages of annexation would be realized to the fullest extent practicable.

The ore handlers at the docks in Cleveland, who have been on strike for several weeks, seriously obstructing the business of the port, resumed work on Friday at the rate demanded by them, \$2 a day.

The United States Electric Light Works, in Newark, took fire from some part of the electric apparatus and was wholly destroyed; loss, \$150,000.

The Pennsylvania Railroad Company are establishing a ferry between Bergen Point and Staten Island, and propose other improvements on or near the site of the contemplated Kill von Kull bridge, with the object, it is suspected, of forestalling the Baltimore and Ohio in their plans for reaching New York City, though little authentic information on this subject can be obtained. The Phoenix Iron Company have secured the contract for the iron work across the Arthur Kill, and construction will be started at once.

Consul-General Alden has laid before the State Department at Washington reports relating to Italian shipping, showing that the bounty system has been of little benefit to the mercantile marine of that country. On the contrary, while one or two large navigation companies are among the beneficiaries, others of less importance derive little or no advantage.

German aggressiveness in commercial fields is often remarked in American consular reports. The foreign trade of Germany is constantly extending, and the German commercial marine is growing in like proportion. In 1880 their steam merchant navy numbered 374 vessels; in 1885, 509. The tonnage of 1880 was 196,343 tons; of 1885, 410,065 tons, or more than double. In 1880 the average number of tons per ship was 523; in 1885 it was 800. Germany, it now appears, carries under her own flag about 50 per cent. of her trade.

Two fine steel boats have been added to the Hoboken ferry, the Orange and Montclair. They are 219 feet long, 36 feet wide and 14 feet in depth. They have steel hulls, iron wheels, 16 collision bulkheads or watertight compartments and all the latest improvements. The cabins are sumptuously fitted up in cherry and maple wood, with other artistic appointments. They cost \$115,000 apiece. They are steered by steam gearing.

The extent of the rubber trade in this city is indicated by a sale of 600,000 pounds last week to supply the demands of a single firm engaged in manufacturing. There are three firms that use this amount of material every month. In New York City alone the consumption amounts to over 10,000,000 pounds yearly. Contrary to a recent report, there is no "deal" in rubber.

The relief for steamboat interests on Western rivers expected from the enforcement of the Interstate law proves to have been illusory, so far as concerns the Mississippi Valley. Two Anchor boats have been

built for St. Louis owners, and there are in addition a few contracts in hand at the principal yards, but not sufficient to make good the usual losses. The new law imparted some stimulus to river trade so far as it was applied, sufficient to show that a revival of a branch of industry now in its decadence must have followed had the Interstate law been enforced in its entirety.

The Sandwich Islands Government shows some signs of disintegration, which may be attributed chiefly to extravagance on the part of the King, involving the treasury in heavy indebtedness to Mr. Spreckles, the "sugar king," and others, for which, according to report, relief has been vainly sought in a foreign loan. The native population is gradually diminishing, as a result of degenerated blood, while the foreign element as gradually increases, mainly through Chinese immigration, which has been stimulated by the demand for laborers on the sugar plantations. During the last two years the loss of white population has been 1056, while the gain in Chinese in that time has been 3445. The Chinese are now more discontented than any others, and the general situation is such that the royal palace has been fortified, as if in preparation for a siege. In order to provide revenue for the treasury, the King accepted \$75,000 from a Chinese company for a monopoly in the sale of opium, and \$80,000 from another, and the hostility of the Chinese in their present attitude is supposed to arise from an alleged breach of faith.

The *Pull Mall Gazette* gives the following comparison of American petroleum with that from the Russian oil fields: "United States crude petroleum oil is to Russian crude as cream to skim milk. United States crude yields about 75 per cent. of the finest illuminating oil the world produces. Russian crude only yields about 29 per cent. of an inferior illuminating oil. United States crude yields about 12 per cent. naphtha or spirit of such a valuable character that it readily sells for 20 per cent. per gallon more than the oil. Russian naphtha is unmarketable, and it is mostly burned to get rid of it. United States lubricating oils, another product of crude, are now so low in price that Russian lubricating oils are practically debarred from competition in many of the European markets. United States crude yields a considerable percentage of paraffine, used for candle making, and this is a product of great value: weight for weight, it is worth four times more than refined petroleum oil. The Baku crude yields no scale. Thus the United States, in the surpassing richness of its crude, has an enormous and unapproachable advantage over Russia."

Anticipating the new Mexican tariff, taking effect July 1, a number of New York merchants are said to have sent their agents forward to Vera Cruz, the City of Mexico and to points along the line of the Rio Grande to examine and report as to the condition of the markets there with a view of meeting their requirements under the new order of things. The Germans, the English and the French have adopted a similar course.

The new vestibule Pullman cars are lighted by electricity from storage batteries, which are each capable of illuminating a single car with 22 16 candle-power lamps for 15 hours.

There is a call in Buffalo for another iron and steel shipyard at this port, where there is only one, while Cleveland has two, and there is one at Detroit. Buffalo's steamboat lines are at the present time having built at Cleveland and Detroit, two large steel steamers for use between the port of Buffalo and other lake ports.

Mr. Powderly, in speaking of the insubordination of the Knights of Labor in District Assembly 126, expressed himself with earnestness with reference to certain violent men of the anarchist type, who are not wanted in the order: "The Knights of Labor are at war with such ideas, and we will not have them in our order. I intend to do all I can," exclaimed Mr. Powderly, as he brought his clenched fist down with impressive force, "to purge the order of this violent element. These men cannot remain with us any longer. The authorities have been too lenient with them. I hold that when such a man as Johann Most delivers inflammatory utterances against life, liberty and property, encourages bloodshed and exhorts people to follow the red handed example of the seven Chicago murderers, he ought to be put in prison and kept there. We should not wait for some overt act of wickedness; his declarations are enough."

The fact that financiers in Berlin have recently been taking the Russian loans may be construed as evidence of more peaceful prospects in Europe. Remarkings on these operations, the *London Economist* says that, since the German bourses have taken up the new inland loan, a notice has appeared announcing the conversion of the metal bonds of the Russian Reciprocal Land Credit Union at 4½ per cent., exempt from all taxes and guaranteed by the State. The firms of Rothschild in Paris and Frankfort, Bleichroder in Berlin, the Discounting Bank in St. Petersburg and the International Commerce Bank have undertaken the conversion.

A conference committee of 70 iron manufacturers, including four from Ohio and two from West Virginia, held a meeting in Pittsburgh on Monday to consider the new scale of wages as presented by the Amalgamated Association. "We simply decided not to

grant the advance demanded," remarked one of the manufacturers. "We not only object to the general advance of 10 per cent., but to the extras. It amounts to an advance of about 15 per cent. on the present rate of wages."

Sales on the New York Real Estate Exchange since the opening season, about February 1, amount to \$23,737,000, or say upward of \$3,000,000 in excess of the corresponding period last year. The season is pronounced very satisfactory, with prices strong and more buyers than sellers. Other years have been equal in the amount of business done, but none have approached 1887 in stability.

Ore shippers at Cleveland are much pleased with the exploits of the new steel steamship Cambria, built by the Globe Iron Works, which arrived at that port with 2367 tons of ore, drawing 15½ feet of water and making an average speed of 12 miles an hour.

Honolulu, the capital of the Sandwich Islands, has recently received from New York a full equipment of hydrants for the municipal water system, together with fire engines and apparatus of the best American manufacture, and the streets of the city are lighted by electricity.

The deep well on the Cleveland Rolling Mill Company's premises at Newburg, Ohio, is showing a surprisingly strong pressure of gas, and the prospects of the gas search in Cuyahoga county are more encouraging than before.

The recent French naval maneuvers between Toulon and Algiers show that the efficiency of the torpedo boat as a means of attack is still an open question.

Stove making at Sing Sing prison has been resumed, and by the end of the week 500 men will be at work in the foundry vacated by Perry & Co.

A submarine cable across the Pacific from Vancouver to Australia is said to be near to actual accomplishment. The managing director of a new company now in San Francisco is reported as saying: "We will touch at Hawaii and Fiji, having secured a substantial subsidy of \$400,000 per year from the Canadian, Hawaiian and Australian Governments, of which Hawaii contributes \$20,000 per year. The total cost of the Pacific submarine cable will be \$10,000,000. The project is now on a firm basis and will be pushed through. Everything has been prepared and the company have registered as required by law."

Plate glass is gradually supplanting the largest sizes of window glass, as it has been found possible to grind it down to a small thickness. It is now made ¾-inch thick without difficulty, while double-thick sheet glass is fully ¼-inch thick. The objection to sheet glass is that it has numbers of spots burned into it in the leer, is often wrinkled through imperfect flattening and is never as clear as plate. But the plate glass manufacturers are constantly bringing the cost of their product nearer that of sheet glass, so that the cost is becoming less a consideration.

The Strong locomotive, No. 444, has gone to St. Paul, that the master mechanics may have a chance to examine it during their convention. It left Jersey City Saturday night hauling the 9 p. m. express train, containing 15 cars, to Philadelphia, and left Philadelphia at 11.50 a. m. Sunday, pulling the heavy No. 1 train of the Pennsylvania, and remained a day at Altoona, and then made the run over the mountains by daylight with one of the express trains, carrying some of the Pennsylvania officers. It ran to Chicago over the Fort Wayne route, and from Chicago to St. Paul over the Chicago, Milwaukee and St. Paul.

W. D. Wood, of Pittsburgh, Pa., has patented a pipe made either of spiral construction or of the ordinary tubular form for use in what is commonly known as "cement pipes." Pipes of this character consist of a shell of sheet metal, lined with a comparatively thick cylinder of cement. The object of Mr. Wood's invention is to provide a joint for the edges of the metal cylinder which shall be both tight and strong. In the construction of this joint, either spiral or straight in character, the overlapping edges are grooved in a way to form a hollow passage, in which a filling is placed. Rivets are used alongside the groove for giving stability to the pipe.

A dispatch from Cleveland, Ohio, dated June 16th, says that the Prospect Machine and Engine Company, formerly the Cummer Engine Company, made an assignment on that day. The capital stock of the corporation is \$400,000, and is held by leading citizens in Cleveland. The liabilities are estimated at \$200,000 and the assets at \$500,000. Gen. M. D. Leggett, president of the company, says that the assignment was caused by the dissatisfaction of certain shareholders who oppose the present organization. He said the corporation would be reorganized and would continue in business.

Some consolidation locomotives belonging to the Chesapeake and Ohio Railroad, with cylinders 20 x 24 inches, are running with exhaust nozzles 5 inches diameter. The company have ordered 14 new consolidation engines from the Baldwin Works, and they will have nozzles 5½ inches diameter, and the officers have no fear but they will steam satisfactorily.

Paper dipped in palladium chloride solution has been suggested and practically tested as a means of detecting gas leakages. The gas reveals itself by coloring the paper brown or black according to its quantity.

"PENNSYLVANIA."

BEWARE OF IMITATIONS.

The great and unprecedented success of the PENNSYLVANIA LAWN MOWER has induced manufacturers of other Lawn Mowers to imitate our open cylinder. Not being able to use the Patents upon which our knives are formed, they all make a bungling attempt to try and accomplish the same result, in trying to secure the same cutting edge on the knives by a different shaped edge which after being in use a short time, reduces the edge of the knife to cause great friction, and without securing the desired results.



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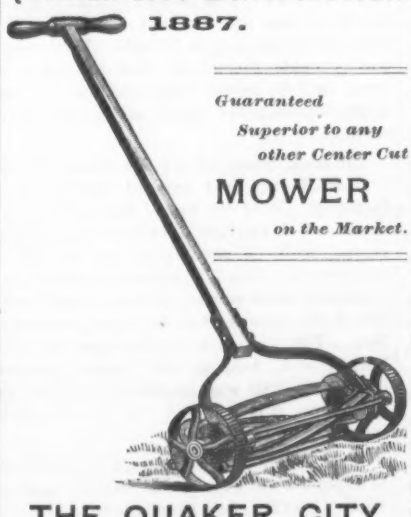
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J. C. McCARTY & CO., New York.
AMES PLOW CO., Boston, Mass.
SIMMONS HARDWARE CO., St. Louis, Mo.
HAMILTON & MATTHEWS, Rochester, N. Y.
MARKLEY, ALLING & CO., Chicago, Ill.
LOGAN, GREGG & CO., Pittsburg, Pa.
JANNEY, SEMPLE & CO., Minneapolis, Minn.
FOSTER, STEVENS & CO., Grand Rapids, Mich.
GEO. TRIT-H HOW CO., Denver, Col.
MOOREHOUSE, WELLS & CO., Decatur, Ill.
A. E. BONESTEELE, Troy, N. Y.
WALBRIDGE & CO., Buffalo, N. Y.
CLARK, QUIEN & MORSE, Peoria, Ill.

HALL & WILLIS MANUFACTURING CO., Kansas City, Mo.
SICKELS, PRESTON & CO., Davenport, Iowa.
M. WITHOFF & CO., Columbus, Ohio.
KROUSE & BAILMAN, Cincinnati, Ohio.
JOHNSON BROS., Cincinnati, Ohio.
BUHL, SONS & CO., Detroit, Mich.
LAYMAN, CAREY & CO., Indianapolis, Ind.
LOCKWOOD, TAYLOR & CO., Cleveland, Ohio.
WM. FRANKFURTH & CO., Milwaukee, Wis.
THE TODD-DONOGAN IRON CO., Louisville, Ky.
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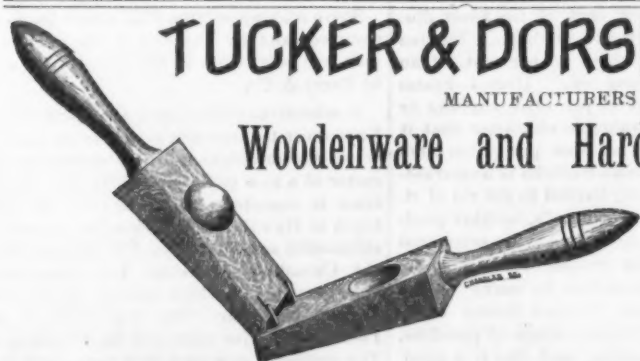
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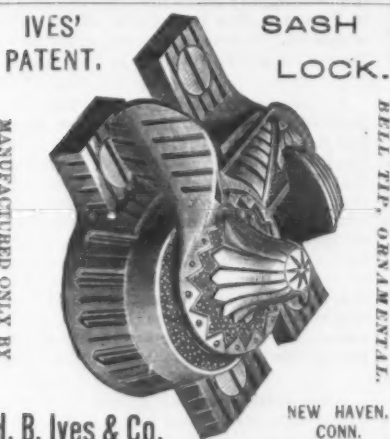
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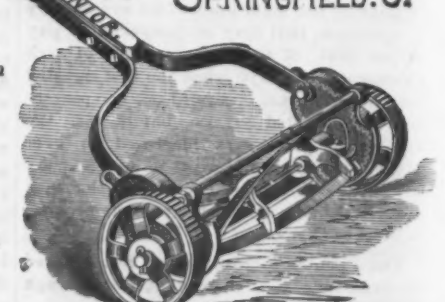
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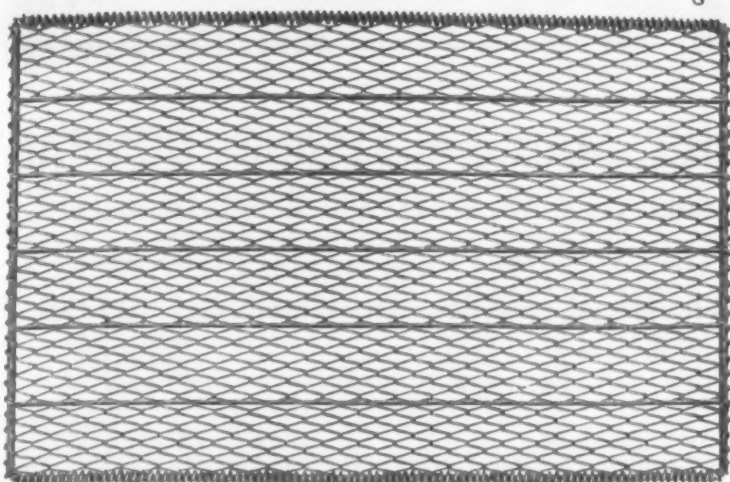
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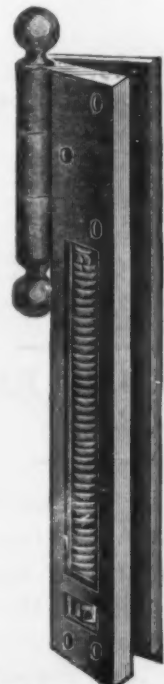
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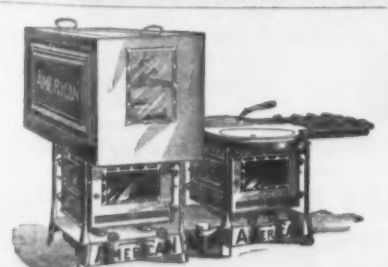


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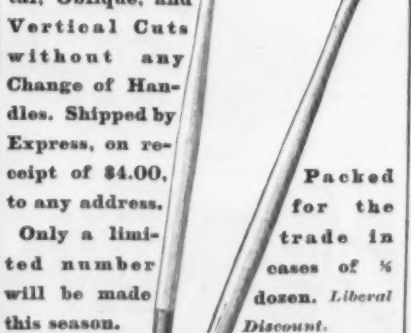


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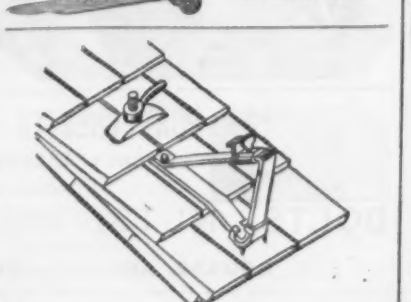
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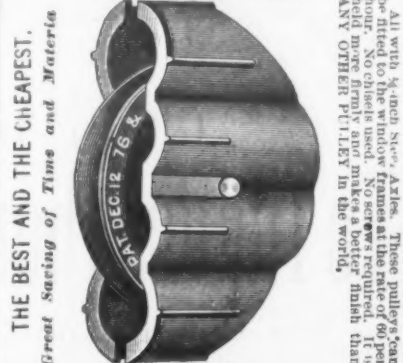
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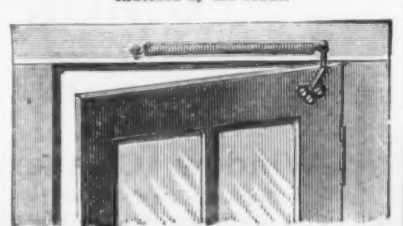


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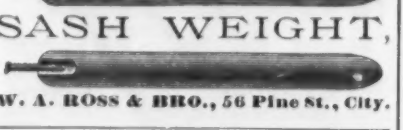
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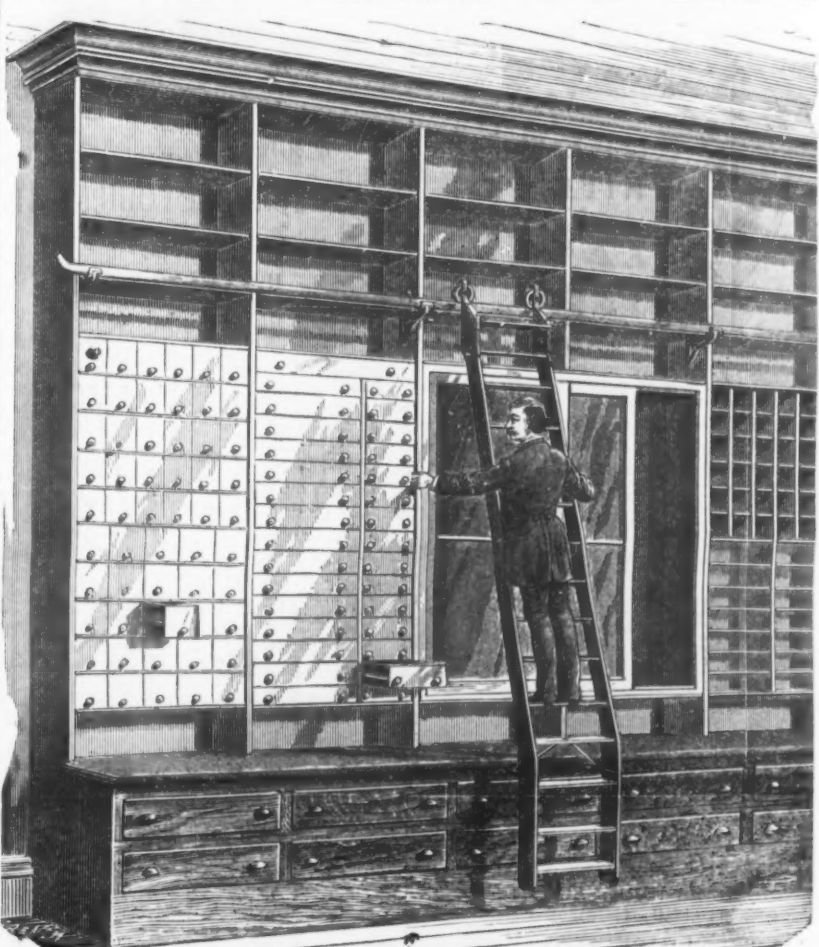
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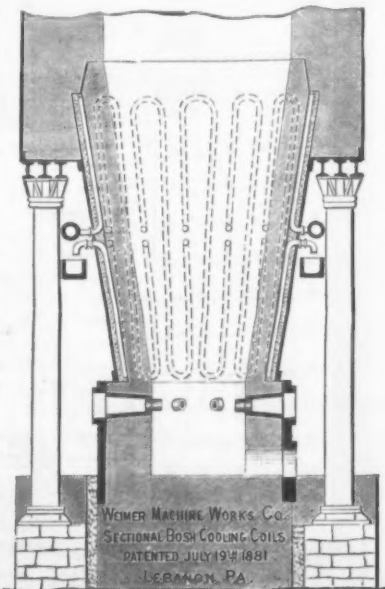
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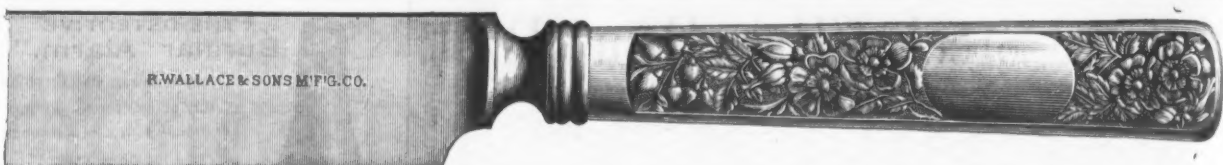
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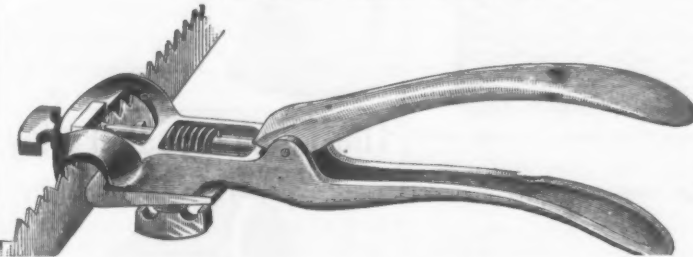
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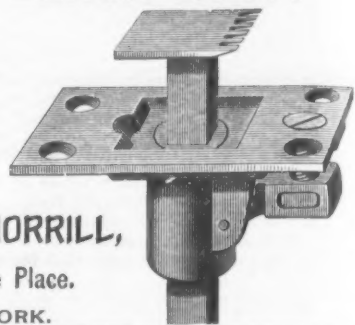
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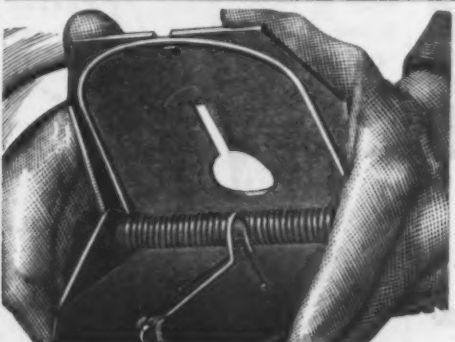


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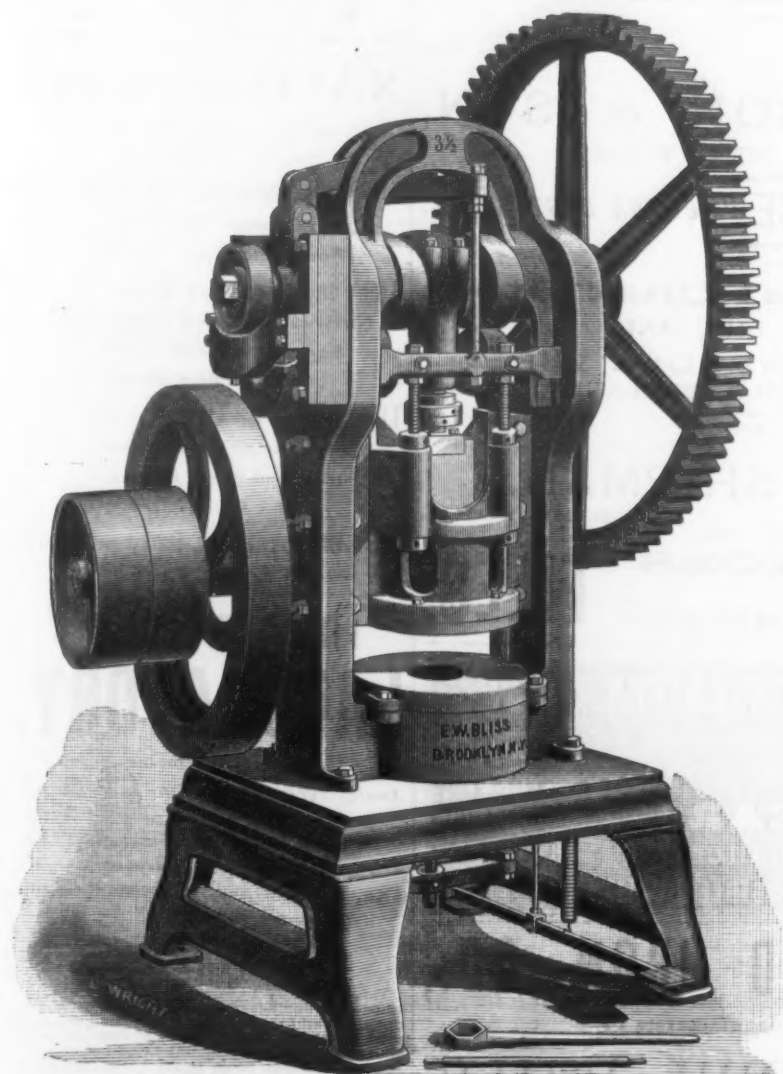


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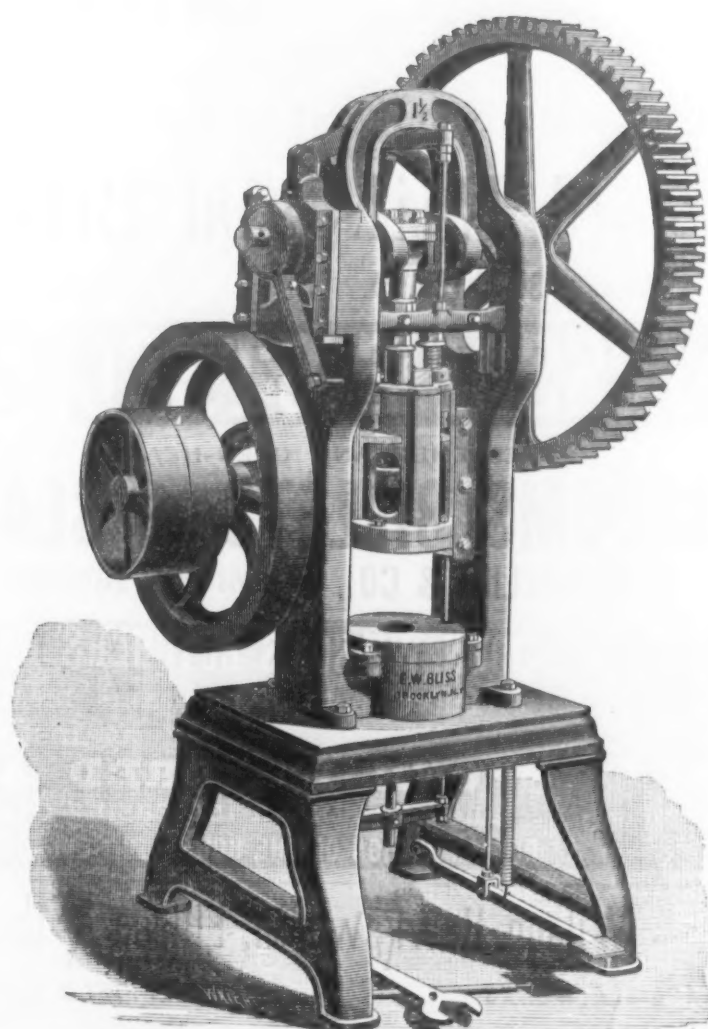
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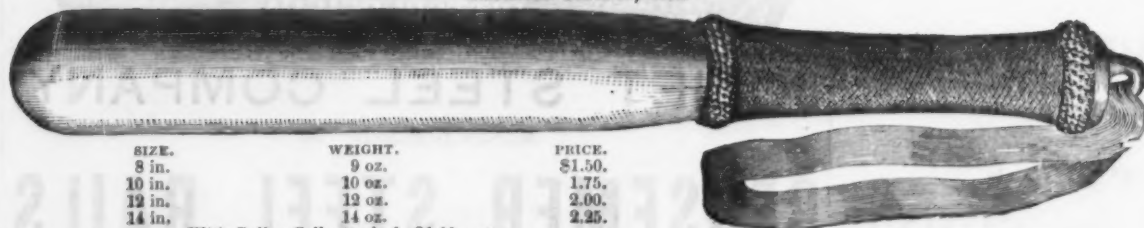
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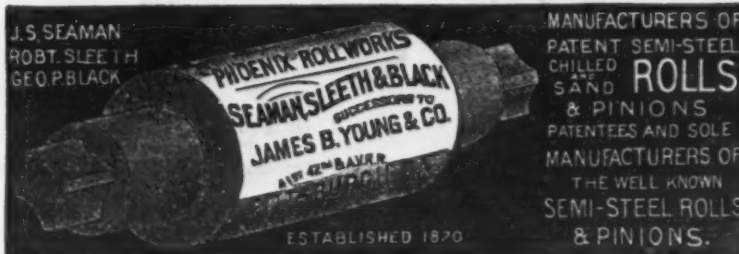
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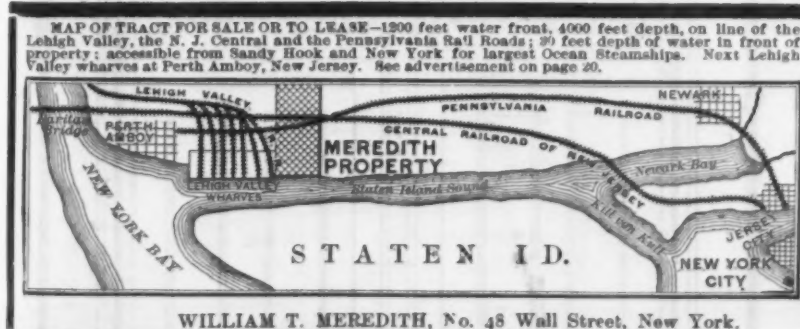
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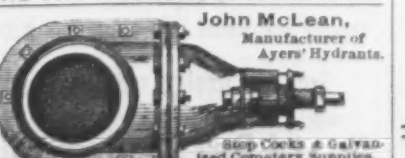
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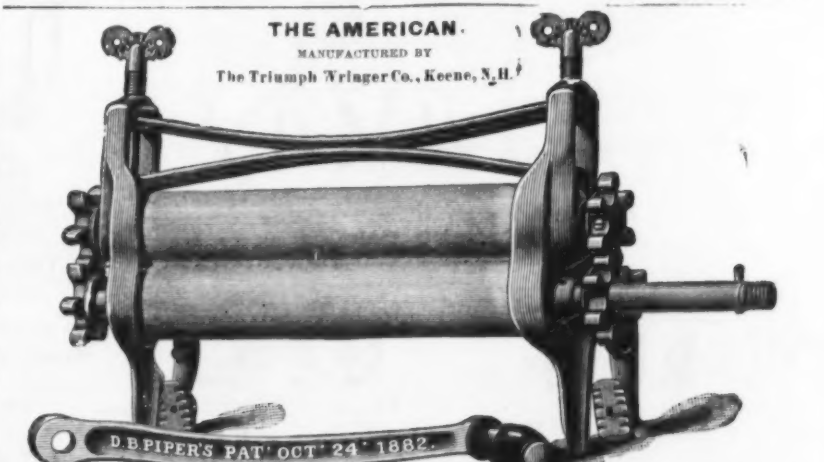
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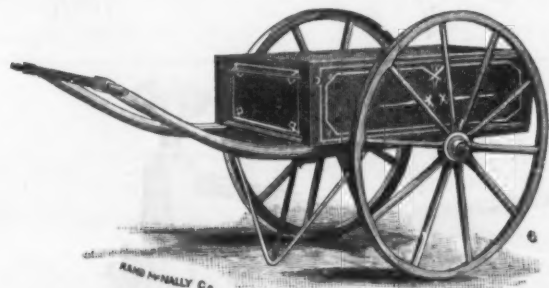
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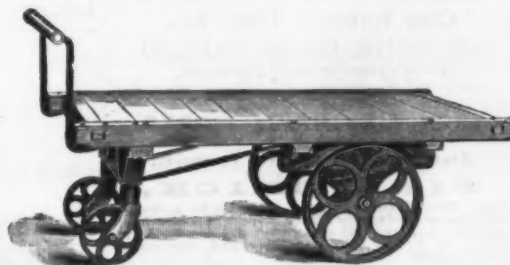
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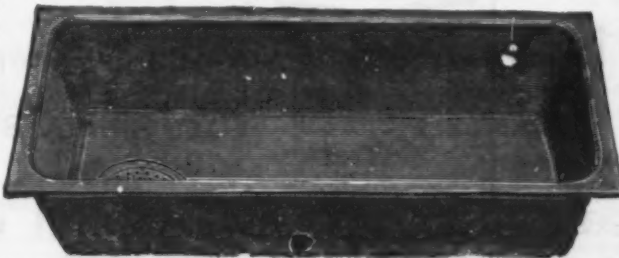
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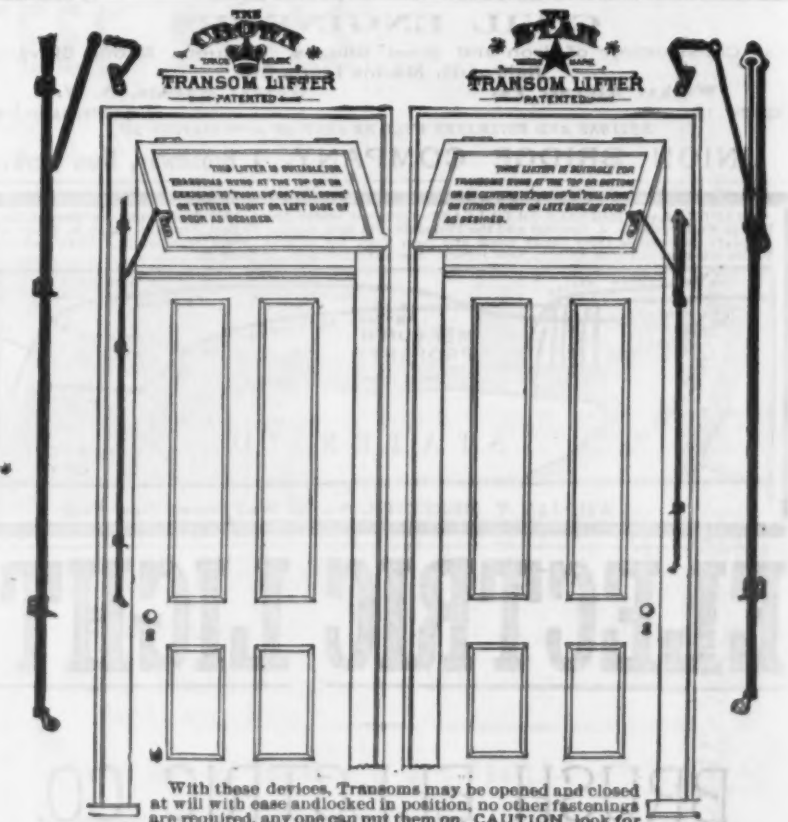
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47	7 "	3/8"	1.25		58	7 "	3/8"	1.30
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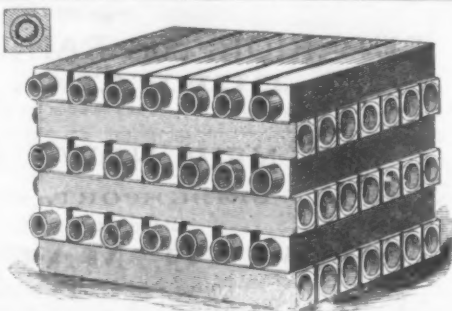
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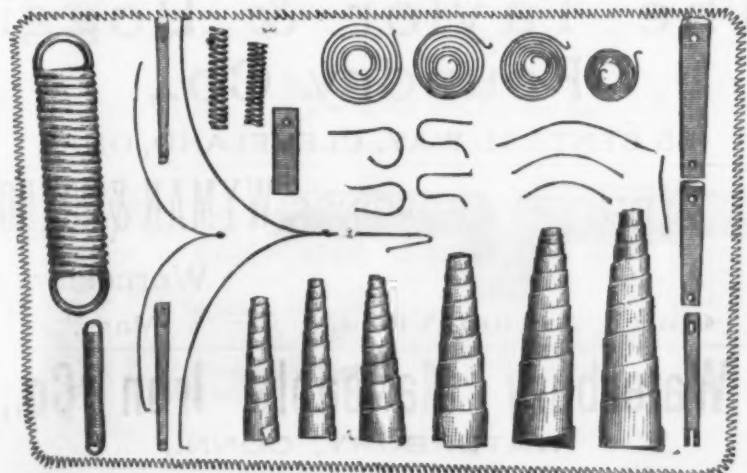
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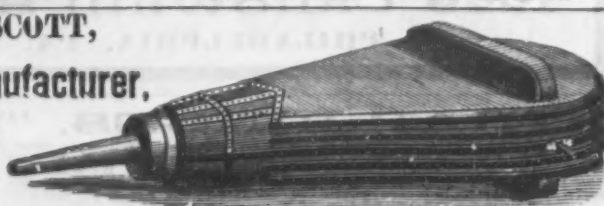
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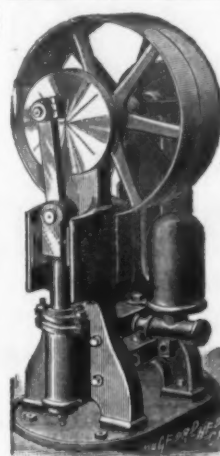
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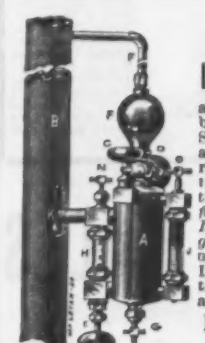
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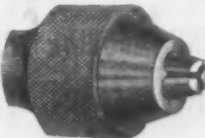
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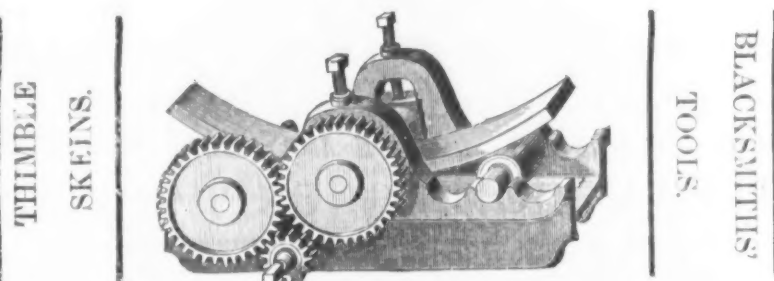
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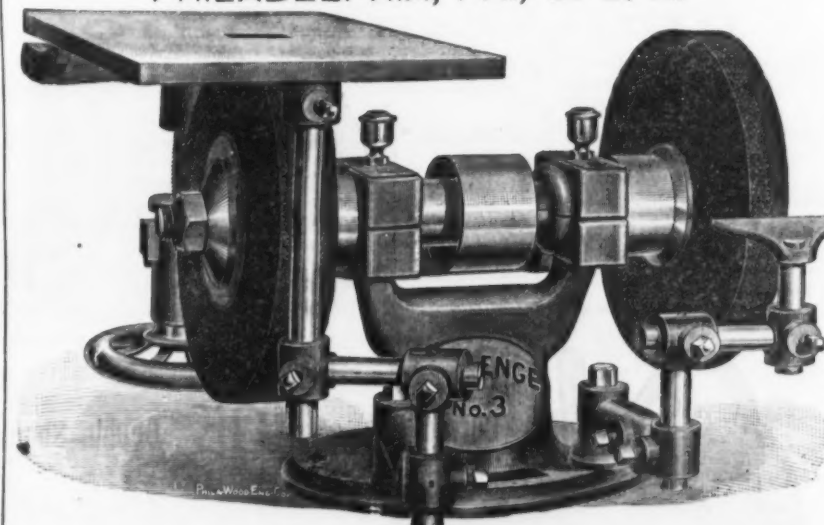
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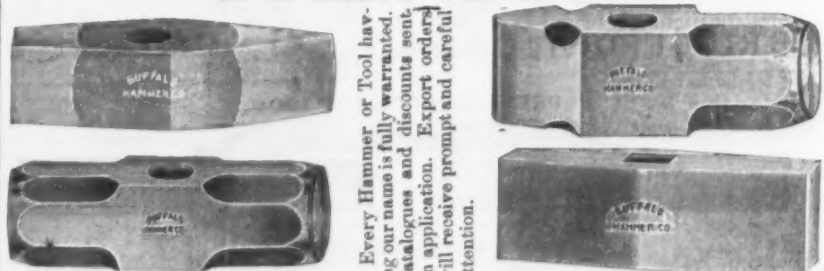
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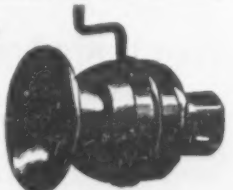
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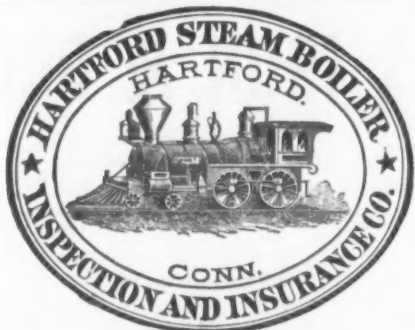
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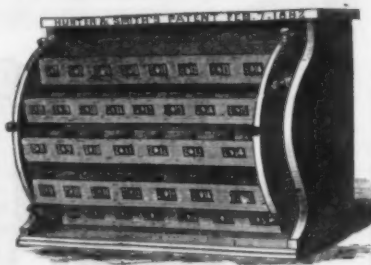
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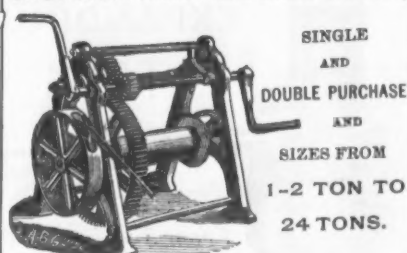
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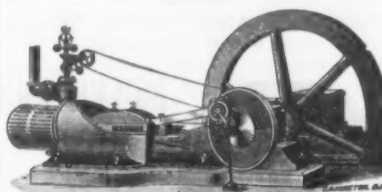
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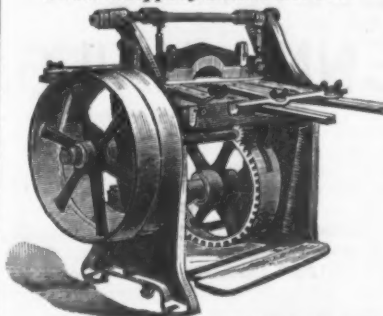
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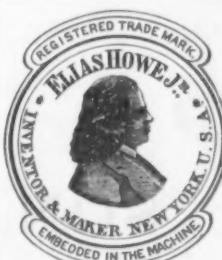
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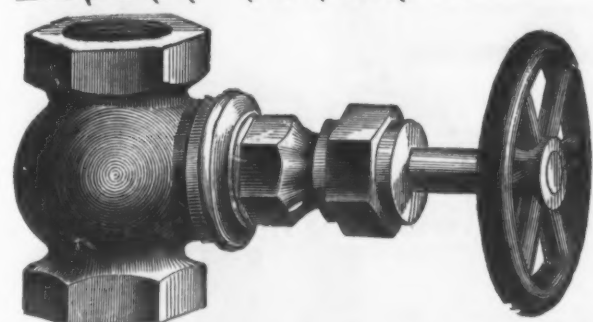
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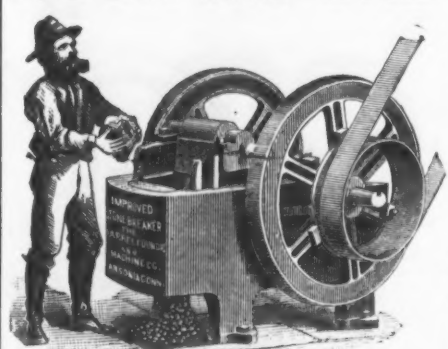
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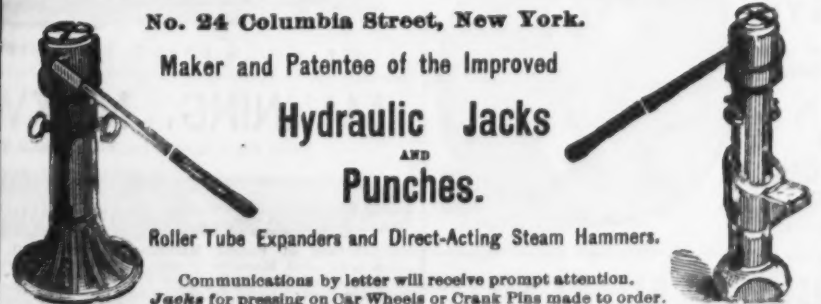
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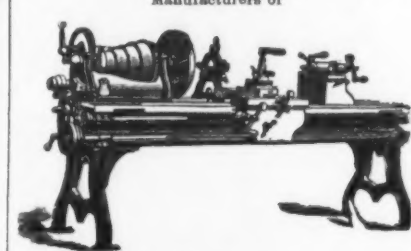
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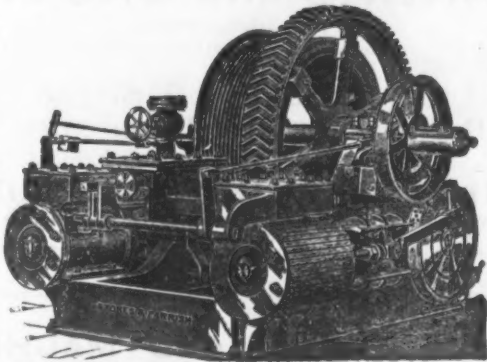
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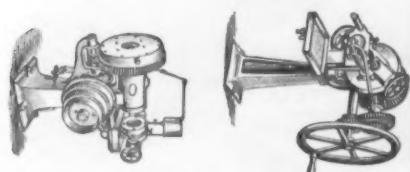
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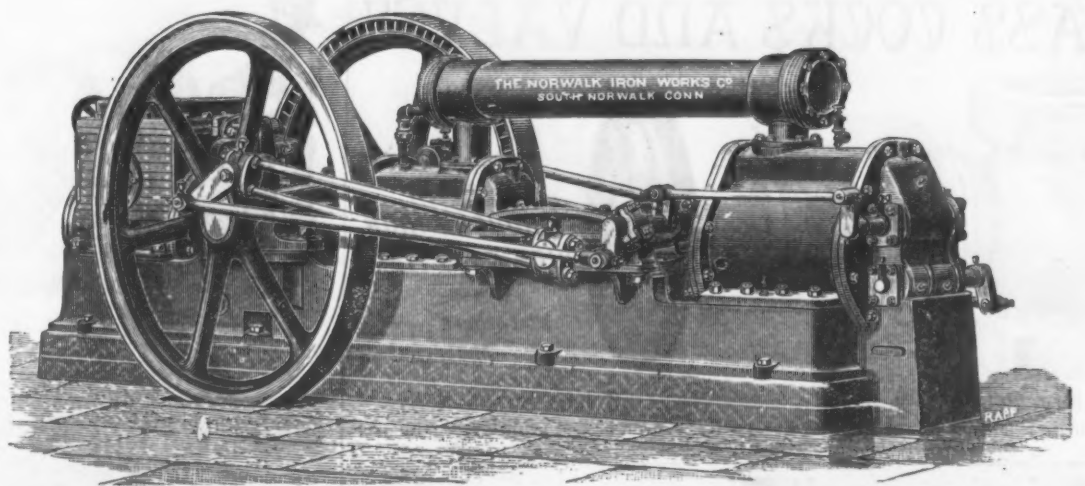
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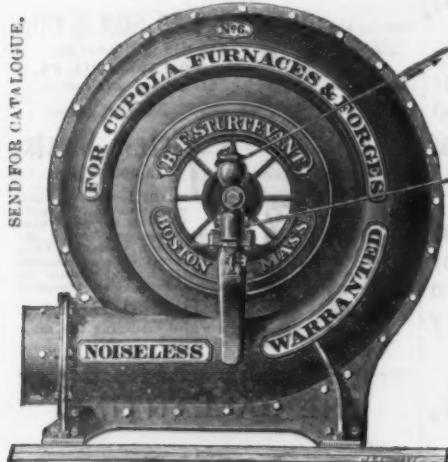
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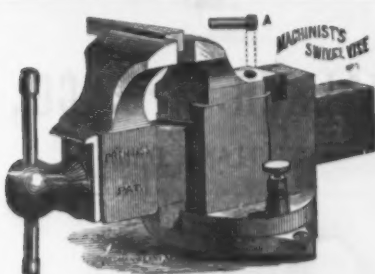
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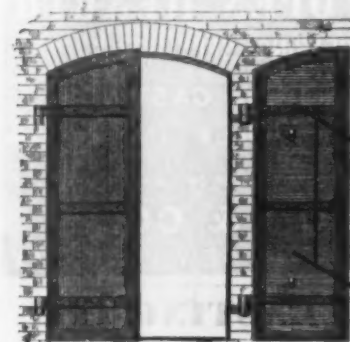
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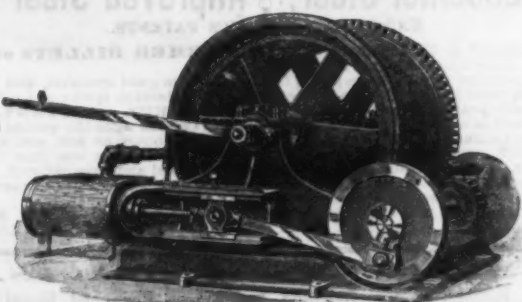
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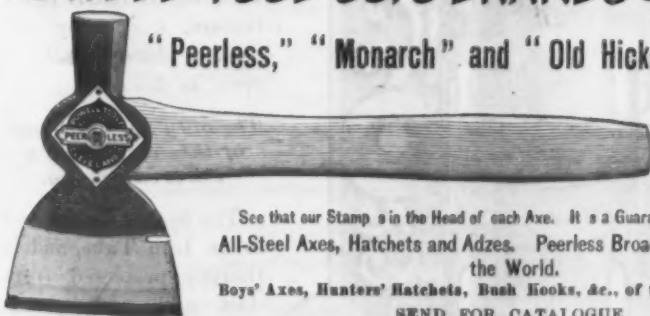
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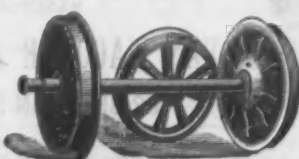
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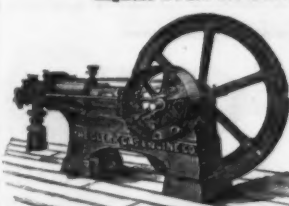
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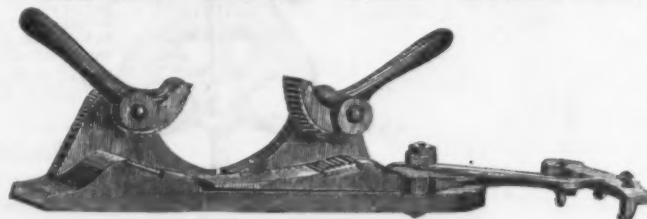
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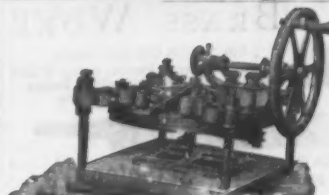
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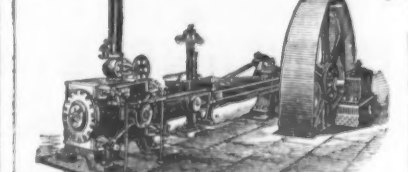
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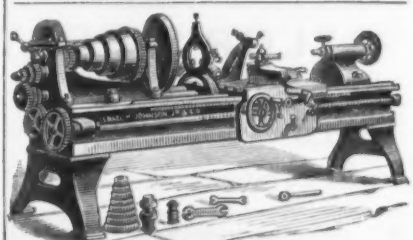
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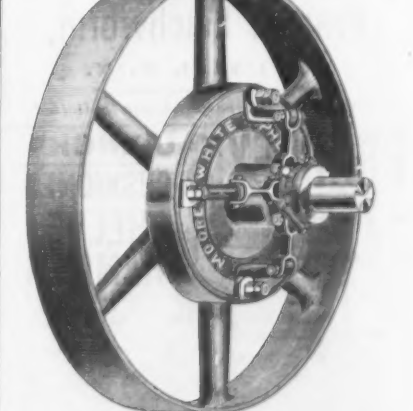
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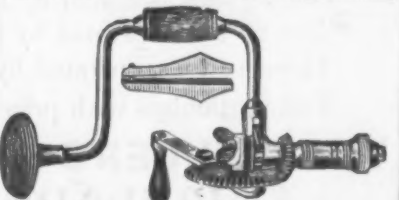
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